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*Frontispiece*
Annals of Medical History
Winter 1928

MICHAEL SERVETUS

[1509 - 1553]

[From Crooke: A Description of the Body of Man. London, 1631.]

ANNALS OF MEDICAL HISTORY
VOLUME X WINTER, 1928 NUMBER 4

# HARVEY'S PREDECESSORS AND CONTEMPORARIES*

*By* SIR HUMPHRY ROLLESTON, BART., K.C.B., M.D.

CAMBRIDGE, ENGLAND

EVEN at the present time when discoveries and advances are so constantly presented to the medical profession there is an attitude of wise caution not unaccompanied by some reluctance and even, at least from reactionaries, opposition to a new idea. What then must have been the feeling and antagonism aroused when William Harvey's "Exercitatio anatomica de Motu Cordis et Sanguinis in Animalibus" (1628), with its entirely new conception of the circulation of the blood, challenged the sacrosanct teaching of Galen which had dominated medicine for more than thirteen centuries? He must have appeared as Zachariah Wood,[1] "Physician of Roterdam," expressed the position in 1673:

> Truly a bold man indeed,
> O Disturber of the quiet of physicians,
> O seditious citizen of the Physical Commonwealth.

His opponents went so far as to call him a quack or "the Circulator," using this Latin word in Martial's sense of a charlatan, and according to the gossipy John Aubrey his practice fell mightily after the appearance of the "De Motu," as "t'was believed by the vulgar that he was crackbrained, and all the physicians were against him." Harvey fully recognized the significance of his action, for though on 17 April 1616, a week before William Shakespeare's death (23 April 1616), he first set out his discoveries, he did not make any public announcement but continued for years to strengthen his argument with fresh data in his Lumleian lectures at the Royal College of Physicians of London. According to Willis[2] there is every reason to believe that the "De Motu Cordis" was written before 1619, but it was not until 1628, an interval of twelve years from his first public demonstration, and when he was fifty years of age, that he thought the time had come to publish at Frankfort, then a central mart for books, his modest but immortal small quarto of seventy-two pages containing the doctrine which he afterwards remarked no man over the age of forty accepted. The dedication of the "De Motu Cordis" "to his very dear Friend Doctor Argent, the excellent and accomplished President of the Royal College of Physicians, and to other learned Physicians, his most esteemed Colleagues" expresses Harvey's anxiety not to broadcast his discovery before it had been submitted to them and received their support. It is noteworthy that in this rare patience and restraint Harvey not only acted on the example of Copernicus, who waited thirty years before publishing "The Treatise of Revolutions," but was followed by his surgical peer John Hunter, who was born late at night 13–14 February 1728, or nearly a hundred years after the "De Motu Cordis" saw the light, so that these two centenaries coincide. Hunter with similar caution was reluctant to publish his observations and worked for eighteen years before, at the age of forty-three, he brought out in 1771 his first work, a treatise on "The Natural History of the Human Teeth." This self-denial in proclaiming a discovery is a striking characteristic of the truly great, and Sir William Osler[3] gives a number of other instances in which a long delay was self-imposed, such as the twenty years before Newton published his discovery in the "Principia," the twenty years that John Napier, Laird of Merchiston, pondered over logarithms before confiding this knowledge to the world, the seventeen years which elapsed between the first draft and the publication of Charles Darwin's "Origin of Species," and the twelve years that Francis Bacon kept the "Novum Organum" by him before he published it in 1620, and after making, it is said, twelve drafts. Admirable as is the desire for perfection, it may, as in Harvey's case, deprive the world of other advances, such as may have been contained in some of his works of which the titles only have come down to us, for example his promised "Practice of Medicine Conformable to his Thesis of the Circulation of the Blood," "Observations on the Function of the Spleen," and "De Insectis." In his "First Anatomical Disquisition on the Circulation of the Blood" addressed to John Riolan he refers to his intended "Medical Anatomy in its Applications to Medicine," and in the second disquisition to the same critic twice mentions his projected "Medical Observations." The loss of such a record from such an observer is a matter for special regret. Some of these may have been destroyed when his house in Whitehall was plundered by the Parliamentarian troopers during the civil wars at some date not later than 1646; others, it is conjectured, may have been burnt in the fire of London in 1666 when, after his death in 1657, his papers were stored in the College of Physicians, then in Amen Corner. Sir George Paget,[4] perhaps rather optimistically, argued that, as there is not any proof of the destruction of Harvey's unpublished papers in the Great Fire, it may be hoped that they are still extant somewhere.

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* The Mary Scott Newbold Lecture, delivered at the College of Physicians, Philadelphia, Pa., on 22 March 1928.

When a new discovery is made known its adverse reception may take the forms of questioning its claim to priority and ascribing the credit to others, or of denying its truth. It may therefore be worth while in the tercentenary of the publication of William Harvey's epoch-making discovery to glance briefly at his predecessors and contemporaries in connection with the circulation of the blood.

There is a temptation to read into the substance and speculations of former writers a prophetic anticipation or even priority of later and well established additions to knowledge; though attractive this pursuit is often fallacious. Some enthusiastically ingenious interpreters of Shakespeare's references to the blood have seen in his various plays an approach to an anticipation of Harvey's discovery, or even, like Thomas Nimmo, have suggested that Shakespeare had direct information on the subject from Harvey who, as already mentioned, gave his first lecture on the subject a week before Shakespeare's death. There is not any means of coming to a decision on this last suggestion; but judging the quotations on their merits we must agree with St. Clair Thomson,[5] who has collected a number of them, that they merely voiced the long accepted view that the blood moved in the vessels and that Shakespeare did not have any conception of the complete circulation. As an extreme example of what piously biassed imagination may bring forth, John Smith's remarkable opinion in his "Pourtraiture of Old Age" (1666), a paraphrase of "the six former verses" in the 12th Chapter of Ecclesiastes "made plain and easie to a mean capacity," may be mentioned; he asserted (p. 233) that King Solomon accurately knew the details of the circulation of the blood, "yet it pleased the Lord that this knowledge should with the possessor of it sink into dust and darkness, where it lay buried for the space of 2,500 years at the least, till it was retrieved therefrom by the wisdom and industry of that incomparable, and forever to be renowned Dr. William Harvey, the greatest honour of our Nation."

It is, however, also true that before a new advance is made the idea is often in the minds of a number of active workers, and it may be almost a matter of chance who solves the problem first; this last statement applies with fair truth to the discovery of *x*-rays by Roentgen in 1895, but not to that of Harvey, though of course others about that time wrote, often with little basis of observation or experiment, on the vascular system.

### HARVEY'S PREDECESSORS

Although quoted by Harvey more often than any other writer, the views of Aristotle (384–322 B.C.) deserve more attention than perhaps they usually receive in connection with the discovery of the circulation of the blood; he knew that the arteries carried blood, vaguely foreshadowed the existence of capillaries, and by locating in the heart the production of the vital or innate heat which, by making the blood boil with the "pneuma" or vital spirit, was regarded as responsible for cardiac expansion and its subsidence (for neither he nor Galen realized its muscular contraction which Leonardo da Vinci first recognized) Aristotle made the heart the important organ not only in the body but with regard to the blood vessels.

Erasistratus (330–245 B.C.) has been described as the first scientific physiologist, and like his contemporary Herophilus was accused, probably falsely, of vivisecting criminals. His addition to the knowledge of the circulatory system was the description of the auriculo-ventricular valves and their mode of action, but he gave to the liver the place in the blood stream which Aristotle had ascribed to the heart and believed that the arteries contained air. Like Aristotle he also imagined that there were synanastomoses or communications between the arteries and the veins; but this was only to explain why an incised artery gave out blood. As Crawfurd[6] expresses it, Erasistratus the surgeon, who knew that blood issued from a severed artery, found himself in conflict with Erasistratus the physiologist who held that the arteries, as their name implies, contained air, and was therefore driven to the elaborate and certainly ingenious hypothesis, which his contemporary Praxagoras of Cos also professed, that when an artery was opened the pneuma or air escaped, and to prevent the vacuum abhorred by nature, normally closed communications[7] between the arteries and veins opened and allowed blood to fill the wounded artery.

Galen (131–200 A.D.), who has been called one of the greatest anatomists and physiologists of the world (Payne[8]) and "the father of vivisection" (Van Leersum[9]) was also a clinician and encyclopedist; but in spite of this he passed into oblivion in the dark ages. With the renaissance and the revival of Greek he again became dominant, and, in spite of Paracelsus' dramatic rebellion against Galen in particular and anatomy in general, and of Vesalius' more valuable critical revision of some of his anatomical statements, remained so for a long time. It has been thought that Galen's literary style stands in the way of his due appreciation by the modern world, and there certainly has been, perhaps as a reaction against his former supremacy, a decided tendency to insist more on his mistakes, which in some degree occurred because his observations on man were few and hurried, than on his services to medicine. These services were great; in addition to being an original dissector, experimenter, and an encyclopedic writer, his insistence on the importance of anatomy led after the renaissance to the revival of anatomy, without which the discovery of the circulation might have been much delayed; had it not been for this result of his influence, medicine would probably have remained long in a state of pure empiricism and not been placed on a scientific basis. Galen therefore was an important forerunner of Harvey, and indeed without Galen who, Payne considered, has perhaps been more persistently misunderstood and even misrepresented than any other man of equal intellectual rank, there might not have been the discovery of the circulation in Harvey's time.

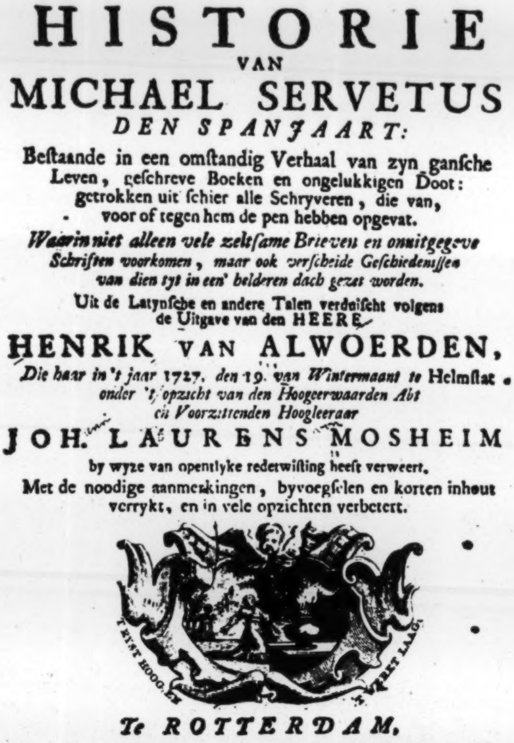
Like Aristotle, he recognized that the arteries contained blood and that the blood from the left ventricle was driven over the body, but by stating that the blood from the right ventricle must pass to the left through innumerable invisible foramina in the interventricular septum he has been much blamed for hindering correct physiological knowledge; but, as Payne shows, Galen's methods were sound, as they consisted in observations on animals though some of his deductions were entirely erroneous.

In discussing the interesting question why Galen, who in many ways was so near the discovery, and why Harvey's later predecessors, such as Servetus and Columbus, who understood the lesser circulation, did not anticipate Harvey, Payne concludes that they lacked that peculiar high faculty of synthesis which is rightly regarded as an attribute of genius and closely allied to poetic imagination, and that further they were without the power of carefully verifying and proving the product of such an inspiration, as Harvey so eminently did.

Passing over the dark ages let us glance at Harvey's more immediate predecessors. When a student at Padua from 1600[10] to 1602 Harvey came under the vivifying influence of the experimental method and the example of Galileo and others; incidentally it may be noted that the chief claims for priority in the discovery of the circulation have been made on behalf of Italians. Hale-White,[11] however, has recently argued that the teaching of his senior contemporaries in England, William Gilbert (1540–1603) and Francis Bacon (1561–1626) must have stimulated Harvey to use the experimental method.

Leonardo da Vinci (1452–1519), the universal genius and "forerunner" of so many subsequent discoveries, dissected more than a hundred human bodies and made experimental observations on the movements of the pig's heart. As he could not see them, he emphasized the invisibility of Galen's pores in the inter-ventricular septum, but did not deny their existence, and, as Bayliss[12] pointed out, realised that the blood is driven into the arteries by the heart. His projected work on anatomy and physiology never saw the light; but his observations on the function of the valves of the heart and various points in which he made advances on current knowledge and departed from the Galenic tradition, have in comparatively recent times been dug out of his notebooks and drawings.

Michael Servetus, born in Villanueva in Spain in 1509, studied anatomy in Paris, and was a fellow student and prosector with Vesalius under Joannes Guinterius (John Winter of Andernach, 1487–1574) and under Jacobus Sylvius (Jacques Dubois, 1478–1555); the latter, a bigoted follower of Galen, who subsequently spoke of Vesalius as a madman for his corrections of Galen's errors, must be distinguished from Franciscus Sylvius (Franciscus de le Boë, 1614–1672) of Leyden, who did for Harvey's views what Ambroise Paré had done for those of Vesalius. Servetus was an encyclopedist indeed, being a jurist, astronomer, meteorologist, geographer, and medical man, but at heart a religious nonconformist, so that his interest in anatomy was merely a step to the knowledge of the spirit of man and so of God. He was a restless wanderer through Europe, continually getting into trouble as a reformer, until 1540 when he settled in practice at Vienne in Dauphiné, hiding his identity under the name of Villeneuve. But in 1553 he secretly had printed his "Restitutio Christianismi" at Vienne. This led to his trial, characterized, as Sir John Macdonell[13] showed, by gross irregularities, at John Calvin's instigation; on 27 October 1553 he was burnt alive at Geneva, and with him practically all the thousand copies of his offending book. It is said that only three copies, two complete, one in Paris and the other in Vienna, and an incomplete one at Edinburgh, now exist. In it he clearly showed that he realized the circulation through the lungs and wholly rejected the hypothetical passage of blood through the inter-ventricular septum. This remarkable book, which though printed was never published, had been circulated in manuscript among his friends for some seven years before it was printed, as is proved by the existence of a draft dated 1546 in the Bibliothèque Nationale (MS. Latin 18212), Paris (Mackall[14]); it is therefore quite possible, as Michael Foster[15] tentatively suggested, that Andreas Vesalius, the father of modern anatomy, may have seen the copy sent to Curio in Padua and so have been led to a more emphatic doubt of the trans-septal passage of blood in the second edition (1555) of the famous "De Humani Corporis Fabricâ" than was expressed in the first edition of 1543. According to Ceradini, however, Vesalius learnt the impermeability of the septum from his prosector Columbus in 1542. But, as Osler[16] in his charming account of Servetus points out, his discovery was unrecognized until in 1697 William Wotton,[17] stimulated by Charles Bernard, surgeon to St. Bartholomew's Hospital, called attention to it. In the meanwhile Mattheus Realdus Columbus (1516–1559) of Cremona, first pupil, then would-be supplanter, and finally for one year successor of Vesalius at Padua, had left behind him a work "De Re Anatomica" (published in 1559) which in the main is an inferior imitation of his teacher's "De Fabricâ," but contains a description, closely



HISTORIE
VAN
MICHAEL SERVETUS
*DEN SPANJAART:*
Beſtaande in een omſtandig Verhaal van zyn ganſche
Leven, geſchreve Boeken en ongelukkigen Doot:
getrokken uit ſchier alle Schryveren, die van,
voor of tegen hem de pen hebben opgevat.
*Waarin niet alleen vele zeltſame Brieven en onuitgegeve*
*Schriften voorkomen, maar ook verſcheide Geſchiedeniſſen*
*van dien tyt in een' helderen dach gezet worden.*
Uit de Latynſche en andere Talen verduiſcht volgens
de Uitgave van den HEERE
HENRIK VAN ALWOERDEN,
*Die haar in 't jaar 1727. den 19. van Wintermaant te* Helmſtat
*onder 't opzicht van den Hoogeerwaarden Abt*
*en Voorzittenden Hoogleeraar*
JOH. LAURENS MOSHEIM
by wyze van opentlyke redetwiſting heeft verweert.
Met de noodige aanmerkingen, byvoegſelen en korten inhout
verrykt, en in vele opzichten verbetert.

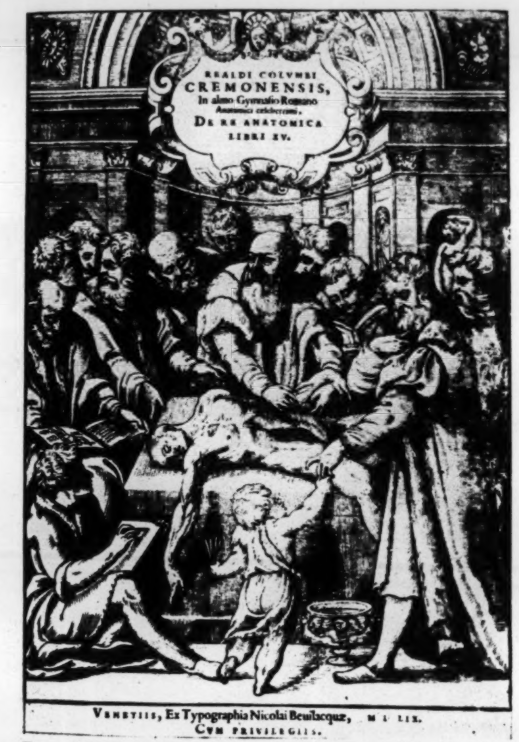
*Te ROTTERDAM,*
By JAN DANIEL BEMAN,
MDCCXXIX.

FIG. 1. TITLE PAGE OF "HISTORIE VAN MICHAEL SERVETUS DEN SPANJAART."

following that of Servetus, of the lesser circulation. As an explanation of this resemblance Chéreau[18] propounded the surprising view that Servetus copied from Columbus, instead of the much more probable solution that, in spite of Ceradini to the contrary, Columbus borrowed the idea and the words from one of the manuscript or printed copies of Servetus' "Restitutio Christianismi." As bearing on this explanation it may be mentioned that Columbus took as his own the description of the palmaris brevis muscle really given by Canano (vide Streeter[19]). Harvey, however, had not any knowledge of Servetus' book and refers with respect to Columbus on several occasions, speaking of him as "that skilful and learned anatomist."

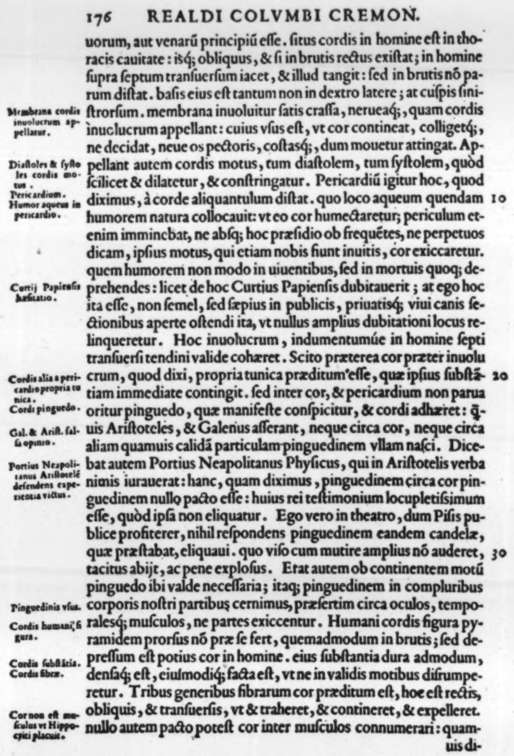
FIG. 2. FABRICIUS AB AQUAPENDENTE. (FABRICIUS LECTURING IN THE AULA OF THE UNIVERSITY OF PADUA.)

Andreas Cesalpinus of Arezzo (1519–1603), Professor of Botany and Medicine at Pisa (1555–1592) and later (1592–1603) at the Sapienza College at Rome, has also been regarded as the discoverer of the circulation. From an analysis of his medical writings Michael Foster decided that he fully grasped the pulmonary circulation and had foreshadowed or even anticipated much that was afterwards proved by demonstration about the systemic circulation. He was stoutly opposed to Galen and all his works, and while distinguished as a botanist was, like Servetus, much concerned with theological thoughts, being a theorist rather than an observer. His principal work, "Quaestionum peripateticarum Libri quinque," was published between 1571 and 1593, but his conceptions of the circulation did not attract any attention and were not adopted by Fabricius, professor of anatomy when Harvey was at Padua. In 1876 G. Ceradini, professor of physiology in the University of Genoa, put in a very patriotic claim for Cesalpinus as having not only entirely anticipated Harvey's discovery of the circulation but having gone even further and discovered the capillaries. Ceradini's view was adopted by L. Luciani[20] (1840–1919), the distinguished professor of physiology at Rome, but had in the meanwhile called forth a vigorous reply from R. Willis (in his "William Harvey," 1878) and Sir George Johnson (Harveian oration 1882). The latter rather sternly turned the tables on Ceradini by concluding in the following words:


REALDI COLVMBI
CREMONENSIS,
In almo Gymnaſio Romano
Anatomici celeberrimi,
DE RE ANATOMICA
LIBRI XV.

VENETIIS, Ex Typographia Nicolai Beuilacquæ, M D LIX.
CVM PRIVILEGIIS.

Fig. 3. Title Page of Realdus Columbus' "De Re Anatomica" with a Portrait of Columbus Performing a Dissection.


176 REALDI COLVMBI CREMON.

uorum, aut venarũ principiũ eſſe. ſitus cordis in homine eſt in thoracis cauitate: iſq́; obliquus, & ſi in brutis rectus exiſtat; in homine ſupra ſeptum tranſuerſum iacet, & illud tangit: ſed in brutis nõ parum diſtat. baſis eius eſt tantum non in dextro latere; at cuſpis ſiniſtrorſum. membrana inuoluitur ſatis craſſa, nerueaq́;, quam cordis inuolucrum appellant: cuius vſus eſt, vt cor contineat, colligetq́;, ne decidat, neue os pectoris, coſtasq́;, dum mouetur attingat. Appellant autem cordis motus, tum diaſtolem, tum ſyſtolem, quòd ſcilicet & dilatetur, & conſtringatur. Pericardiũ igitur hoc, quod diximus, à corde aliquantulum diſtat. quo loco aqueum quendam humorem natura collocauit: vt eo cor humectaretur; periculum etenim imminebat, ne abſq; hoc præſidio ob frequẽtes, ne perpetuos dicam, ipſius motus, qui etiam nobis fiunt inuitis, cor exiccaretur. quem humorem non modo in uiuentibus, ſed in mortuis quoq; deprehendes: licet de hoc Curtius Papienſis dubitauerit; at ego hoc ita eſſe, non ſemel, ſed ſæpius in publicis, priuatisq́; viui canis ſectionibus aperte oſtendi ita, vt nullus amplius dubitationi locus relinqueretur. Hoc inuolucrum, indumentumúe in homine ſepti tranſuerſi tendini valide cohæret. Scito præterea cor præter inuolucrum, quod dixi, propria tunica præditum eſſe, quæ ipſius ſubſtãtiam immediate contingit. ſed inter cor, & pericardium non parua oritur pinguedo, quæ manifeſte conſpicitur, & cordi adhæret: q̃uis Ariſtoteles, & Galenus aſſerant, neque circa cor, neque circa aliam quamuis calidã particulam pinguedinem vllam naſci. Dicebat autem Portius Neapolitanus Phyſicus, qui in Ariſtotelis verba nimis iurauerat: hanc, quam diximus, pinguedinem circa cor pinguedinem nullo pacto eſſe: huius rei teſtimonium locupletiſsimum eſſe, quòd ipſa non eliquatur. Ego vero in theatro, dum Piſis publice profiterer, nihil reſpondens pinguedinem eandem candelæ, quæ præſtabat, eliquaui. quo viſo cum mutire amplius nõ auderet, tacitus abijt, ac pene exploſus. Erat autem ob continentem motũ pinguedo ibi valde neceſſaria; itaq; pinguedinem in compluribus corporis noſtri partibus cernimus, præſertim circa oculos, temporalesq́; muſculos, ne partes exiccentur. Humani cordis figura pyramidem prorſus nõ præ ſe fert, quemadmodum in brutis; ſed depreſſum eſt potius cor in homine. eius ſubſtantia dura admodum, denſaq́; eſt, eiuſmodiq́; facta eſt, vt ne in validis motibus diſrumperetur. Tribus generibus fibrarum cor præditum eſt, hoc eſt rectis, obliquis, & tranſuerſis, vt & traheret, & contineret, & expelleret. nullo autem pacto poteſt cor inter muſculos connumerari: quamuis di-

Membrana cordis inuolucrum appellatur.
Diaſtoles & ſyſtoles cordis motus.
Pericardium.
Humor aqueus in pericardio.
Curtij Papienſis hæſitatio.
Cordis alia a pericardio propria tunica.
Cordi pinguedo.
Gal. & Ariſt. falſa opinio.
Portius Neapolitanus Ariſtotelẽ defendens experientia victus.
Pinguedinis vſus.
Cordis humani figura.
Cordis ſubſtãtia.
Cordis fibræ.
Cor non eſt muſculus vt Hippocrati placuit.

Fig. 4. A Page from "De Re Anatomica" Concerning the Circulation.

> The best piece of criticism in Dr. Ceradini's book is that to be found at the commencement of the first chapter, in which, after referring to a tablet in the Veterinary Institute of the University of Bologna, attributing to Carlo Ruini the discovery of the circulation of the blood, he mercilessly exposes the plagiarisms of Ruini and demonstrates the utter absurdity of the attempt to make of him a great discoverer.

Thus is brought to our notice another candidate for priority, but of his claims and those of some others, such as Walter

Warner,[21] the editor in 1631 of Harriott's *Algebra;* Protheroe, and Honoratus Faber, no serious notice is required. A claim for priority has also been made on behalf of Petrus Paulus Sarpi (1552–1623), the Servite, philosopher and theologian of Venice who did much dissection between 1582 and 1585, particularly on the eye, and was quoted by Fabricius, who spoke of him as "the Oracle of the age" in respect to knowledge, both general and of minerals, metals, and anatomy; according to Thomas Cornelius Consentinus, Sarpi came to conclusions identical with those later set out by Harvey, and communicated them to Fabricius, who, though not thinking them of value, told Harvey about them. After Sarpi's death a manuscript account of these views was found and was said to have been seen by Vesling, but the document is not forthcoming and, as Miss Campbell[22] said in her appreciative life of Sarpi, until this account is discovered there is no proof that he wrote on the circulation. The suggestion made that the document found after Sarpi's death in 1623 was only a transcript of the "De Motu" (1628) is obviously fallacious. Sarpi's reference to "a diabolical secret" has been thought by Tollin to refer to the description of the pulmonary circulation by Servetus, who would have been regarded by Sarpi as a heretic and the confidant of the Devil. But this is hardly compatible with what is now known of Sarpi's character. A claim has also been made for Bhava Misra (A.D. 1550) of Benares as having mentioned the circulation in his voluminous work on anatomy, physiology, medicine, surgery, and treatment.

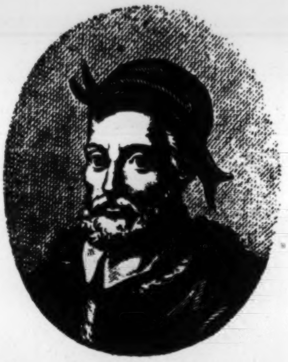
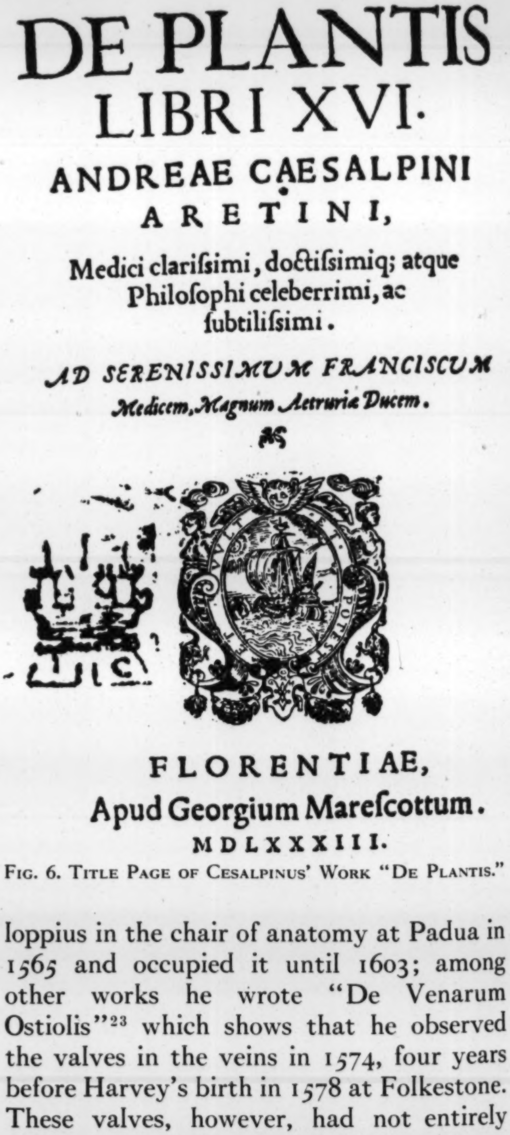


FIG. 5. PORTRAIT OF CESALPINUS.

Hieronymus Fabricius (1537–1619), called from the place of his birth in Tuscany ab Aquapendente, succeeded his teacher Fallopius in the chair of anatomy at Padua in 1565 and occupied it until 1603; among other works he wrote "De Venarum Ostiolis"[23] which shows that he observed the valves in the veins in 1574, four years before Harvey's birth in 1578 at Folkestone. These valves, however, had not entirely escaped the notice of Fabricius' predecessors. In his recent historical survey of this subject Franklin[24] brings forward evidence, as did Haller and Morgagni long ago and Cushing and Streeter[25] in 1925, to show that they were observed and investigated by



DE PLANTIS
LIBRI XVI.
ANDREAE CAESALPINI
ARETINI,
Medici clariſsimi, doctiſsimiq; atque
Philoſophi celeberrimi, ac
ſubtiliſsimi.
AD SERENISSIMUM FRANCISCUM
Medicem, Magnum Aetruriae Ducem.

FLORENTIAE,
Apud Georgium Mareſcottum.
MDLXXXIII.

FIG. 6. TITLE PAGE OF CESALPINUS' WORK "DE PLANTIS."

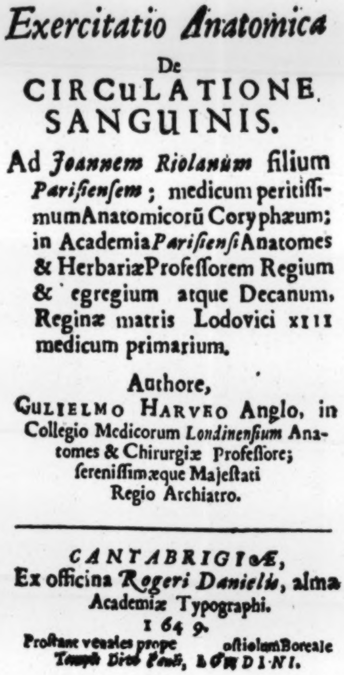
Johannes Baptista Canano of Ferrara (1515–1579) between 1536 and 1546 when he communicated this to Vesalius, but never left any written account of his discovery, and that if Vesalius had verified, accepted, and recorded this observation in the "De Fabricâ" in 1555, the world might not have had to wait until 1628 for Harvey's publication. As events turned out Canano's observation, published in a rather unsatisfactory manner by Amatus Lusitanus in 1551, was discredited by Vesalius, Eustachius, and Falloppius. The first published illustrations of the venous valves were those of Salomon Alberti in 1585 who acknowledged his indebtedness to Fabricius. Others who have been credited with the discovery are Charles Etienne, who according to Cushing and Streeter made the observation in 1538 and published it in 1545; the claim for Sylvius of Paris, put forward by Riolan, is very dubious (Franklin), though his "Isagoge," published in 1555, nine years after Canano made the communication to Vesalius, contains a lucid account of the valves (Streeter); the same appears to hold good with regard to Fra Paolo Sarpi (1582). But the existence of the venous valves was forgotten until Fabricius gave his account of them with figures of the veins in the arm tied for bleeding and showing the position of the valves which were afterwards modified by Harvey in his well-known diagrams in the "De Motu" to show the use of the valves; in his later years Harvey told Robert Boyle[26] that the position of the valves in the veins suggested to him the circulation of the blood.

Gasparo Aselli (1581–1626) of Cremona in 1622 published at Milan a book "De Lactibus sive lacteis Venis" describing the lacteals. Harvey has been said to have turned a blind eye on this discovery and not to have paid proper attention to the lymphatics. In letters to Dr. R. Morison of Paris and Dr. J. D. Horst of Hesse Darmstadt written in 1652 and 1655 Harvey explains that before Aselli's book appeared he had observed these vessels, but after experiment and thought could not agree that they conveyed chyle from the intestines, as the fluid in them seemed to be the same as in the ducts of the mammary glands; with regard to the description of the thoracic duct and the receptaculum chyli in 1651 he expressed his admiration of Jean Pecquet and others for their "singular industry in searching out the truth," but pleaded that his advanced years (being seventy-three years old when Pecquet's book was published) and the infliction of "more and more indifferent health" rendered it impossible for him to go thoroughly into the question. The priority of the description of the lymphatic system is not entirely without question, for Erasistratus and Herophilus are stated to have observed the lacteals, though this was long forgotten, and Eustachius[27] is also said to have recognized the thoracic duct. Their discovery and that of the thoracic duct supplemented Harvey's, though not so vitally as the demonstration, by the lenses of a microscope, of the capillaries.

## RECEPTION OF HARVEY'S DISCOVERY BY HIS CONTEMPORARIES

The appearance of the "De Motu Cordis," in the words of the great Albrecht von Haller (1708–1777) "Opusculum aureum," does not appear to have excited any immediate sensation or written notice. Many perhaps shrank from any disturbance of their comfortable acquiescence in the traditional doctrines of Galen, from the unpleasant experience of thinking, and if thus converted, from laying themselves open to the accusation of heresy. Some even of Harvey's colleagues at the College of Physicians, who had long been more or less familiar with his views from attending his lectures and demonstrations there, may not have regarded him very seriously, and thought of him with kindly pity as a good man with an obsession. This indeed would be compatible with the attitude of Thomas Winston (1575–1655) who was praised by Méric Casaubon as "the great ornament of his profession," and incidentally is said, though this seems rather surprising, to have been, with Simeon Fox and John Argent, both many times President of the Royal College of Physicians, the last physicians to visit their patients in London on horseback[28]; not only was he Harvey's (1578–1657) almost exact contemporary and a Fellow of the Royal College of Physicians, where in later years their names came next to one another in the list, but he was Professor of Physic at Gresham College from 1613 to 1655 (with an interval of mysterious absence in France between 1643 and 1652), while Harvey was Lumleian lecturer at the College for the space of the forty years 1615–1655. Winston, as Censor at the College 1622–24, 1630–32, 1634–37, should often, if he acted like the Censors of the present day, have attended Harvey's lectures and demonstrations on the circulation of the blood. Winston's "Anatomy Lectures at Gresham College," which appeared posthumously in 1659, dutifully follow the Galenic doctrines and, though there are many references to more recent writers, especially Columbus and Riolan, scrupulously refrain from any mention of his colleague's "De Motu Cordis" and demonstrations of the circulation.

After the publication of Harvey's discovery, though it may have at once exercised the minds of some anatomists, there was, at any rate outwardly, a calm for some two years; the first ripple of the coming storm was the appearance in 1630 of "Exercitationes et Animadversiones in Librum Gulielmi Harvaei de Motu Cordis et Circulatione Sanguinis," the maiden production of an afterwards voluminous Scot of French birth—James Primrose; on 9 December 1629 he had been examined and passed as a licentiate of the College of Physicians by Harvey, then a Censor, so this ungracious means of attracting attention to his existence is all the more remarkable. As a pupil of Riolan in Paris he had probably been inspired with opposition to any departure from Galenic piety, and Harvey, who may have realized this, naturally did not take any notice. Nothing daunted Primrose returned to the charge in 1639 and 1640 by entering into a controversy with J. Walaeus (Jan de Wale) on account of the thesis presented by his pupil Roger Drake in 1640 in support of Harvey's views, and also with Le Roy (Regius). Walaeus, it may be mentioned, first opposed Harvey on theoretical considerations, but, when urged by Sylvius of Leyden, investigated the subject by way of experiment, and thus proved himself one of the best physiologists and a worthy follower of Harvey (vide Van Leersum[29]). Primrose in 1638 brought out a book which, although in Latin, was perhaps intended "for revenue purposes," "On Popular Errours or the Errours of the People in Physick," translated into English in 1651 by Robert Wittie, M.D., Cambridge, who practised at Hull as did James Primrose until his death in 1659. It relies on the true faith of Galen and the Fathers, and does not mention the circulation of the blood, though several chapters deal with venesection. The attack made on Harvey by Aemylius Parisanus of Venice in 1635 in his "Lapis Lydius de Motu Cordis et Sanguinis" led Sir George Ent (1604–1689) to defend his senior colleague in 1641 in his first printed work, "Apologia pro Circulatione Sanguinis, Qua respondetur Aemylio Parisano Medico Veneto;" had it not been for Ent's book "the pugnacious old man," as Vesling eventually called Parisanus, would be even less known than he is now. Ent was a loyal Harveian, and later described himself both as performing the office of a midwife and "like another Jason" when in 1650 he was allowed to carry off Harvey's manuscript of "De Generatione Animalium" with permission to give it to the expectant world. Within ten years of the publication of the "De Motu" the controversy had become more widespread; Caspar Hofmann of Nuremberg (1636) and Joannes Vesling (1637) of Padua protested against Harvey. In 1636 Harvey accompanied Thomas Howard, second Earl of Arundel and "Father of Vertu in England," on his political mission as Ambassador extraordinary to the Emperor Ferdinand II at Vienna,[30] and while staying on the way at Nuremberg attempted to convince Caspar Hofmann (1572–1648), his fellow student at Padua, by demonstration of the truth of the circulation on 20 May; but Hofmann, with the rigid mind due to thickened arteries which shortly afterwards were responsible for his paralysis, was obstinate in his adhesion to the ancient faith, and charged Harvey with having "empeached and condemned Nature of folly and error." Vesling, however, after communication with Harvey was less set in his opposition; Vopiscus Fortunatus Plempius (1601–1671) of Louvain also began by dissenting, and then openly transferred his allegiance to Harvey. As already mentioned, Roger Drake (1608–1669), an Englishman educated at Cambridge, was inspired by J. Walaeus to read his inaugural dissertation, "Disputatio de Circulatione naturale," at Leyden in 1640 in support of Harvey, and thus as well as his master became engaged in a wordy warfare with James Primrose whom he answered with great effect in his "Vindiciae contra Animadversiones D. D. Primirosii" in 1641. Five years later he forsook physic for the cure of souls and wrote some theological works. Regius, as already mentioned, had a literary combat with Primrose in 1640. René Descartes (1637), Werner Rolfink (1641), Professor of Anatomy at Jena, and P. M. Schlegel of Hamburg in 1650 supported the new conception. De Back's "Dissertatio de Corde" (1648) was enthusiastically dedicated to Harvey and thus helped to restore the balance of the opposition by his Dutch colleagues van Valkenburg, Heurnius, and van der Linden. The most obstinate antagonism was manifested by Jean Riolan the younger (1580–1657), the well-known Parisian anatomist, who, like Winston, was almost exactly Harvey's equal in age and span of life, but very dissimilar in mental outlook, following the footsteps of his father Jean Riolan (1546–1606) the Dean of the Faculty of Medicine in Paris (1586–7) and a court physician, as a member of the strictest sect of Galenists. In 1648 his "Encheiridium anatomicum et pathologicum" appeared, and while opposing Harvey's views set up a preposterous hypothesis of his own.



*Exercitatio Anatomica*
De
CIRCuLATIONE.
SANGUINIS.
Ad *Joannem Riolanum* filium
*Pariſienſem*; medicum peritiſſimumAnatomicorũ Coryphæum;
in Academia*Pariſienſi*Anatomes
& HerbariæProfeſſorem Regium
& egregium atque Decanum,
Reginæ matris Lodovici XIII
medicum primarium.

Authore,
GULIELMO HARVEO Anglo, in
Collegio Medicorum *Londinenſium* Anatomes & Chirurgiæ Profeſſore;
ſereniſſimæque Majeſtati
Regio Archiatro.

*CANTABRIGIÆ*,
Ex officina *Rogeri Danielis*, almæ
Academiæ Typographi.
1649.
Proſtant venales prope oſtiolum Boreale
*Templi Divi Pauli*, *LONDINI*.

FIG. 7. TITLE PAGE OF HARVEY'S LETTER TO RIOLAN CONCERNING THE CIRCULATION.

Though hardly demanding a reply on its merits, it was the work of the head of the Paris school of anatomists, and Harvey took the opportunity in answering Riolan to develop his position further in his "Exercitationes duae anatomicae de Circulatione Sanguinis ad Joannem Riolan filium, Parisiensem peritissimum Anatomicorum Coryphaeum," 1649, Cantabrigiae. Riolan returned to the charge at once in "Responsio ad duas Exercitationes anatomicas postremas Gulielmi Harvei de Circulatione Sanguinis," 1649, and again in "Opuscula anatomica varia et nova, imprimis de Motu Sanguinis ejusque Circulatione vera," etc. From his letter on 26 March 1651, to P. M. Schlegel it appears that Harvey was preparing a further answer to Riolan, but felt that Schlegel's refutation of the fallacies of his former teacher were perhaps enough. At any rate no further riposte was forthcoming. Ceradini and Luciani express the rather remarkable opinion that Harvey owed his fame to the advertisement resulting from Riolan's opposition and accusations. The Paris school, including Gui Patin (1601–1672) followed the lead of Riolan until a second professor of anatomy in the person of Pierre Dionis (obiit 1718), also surgeon to the Dauphin, was appointed

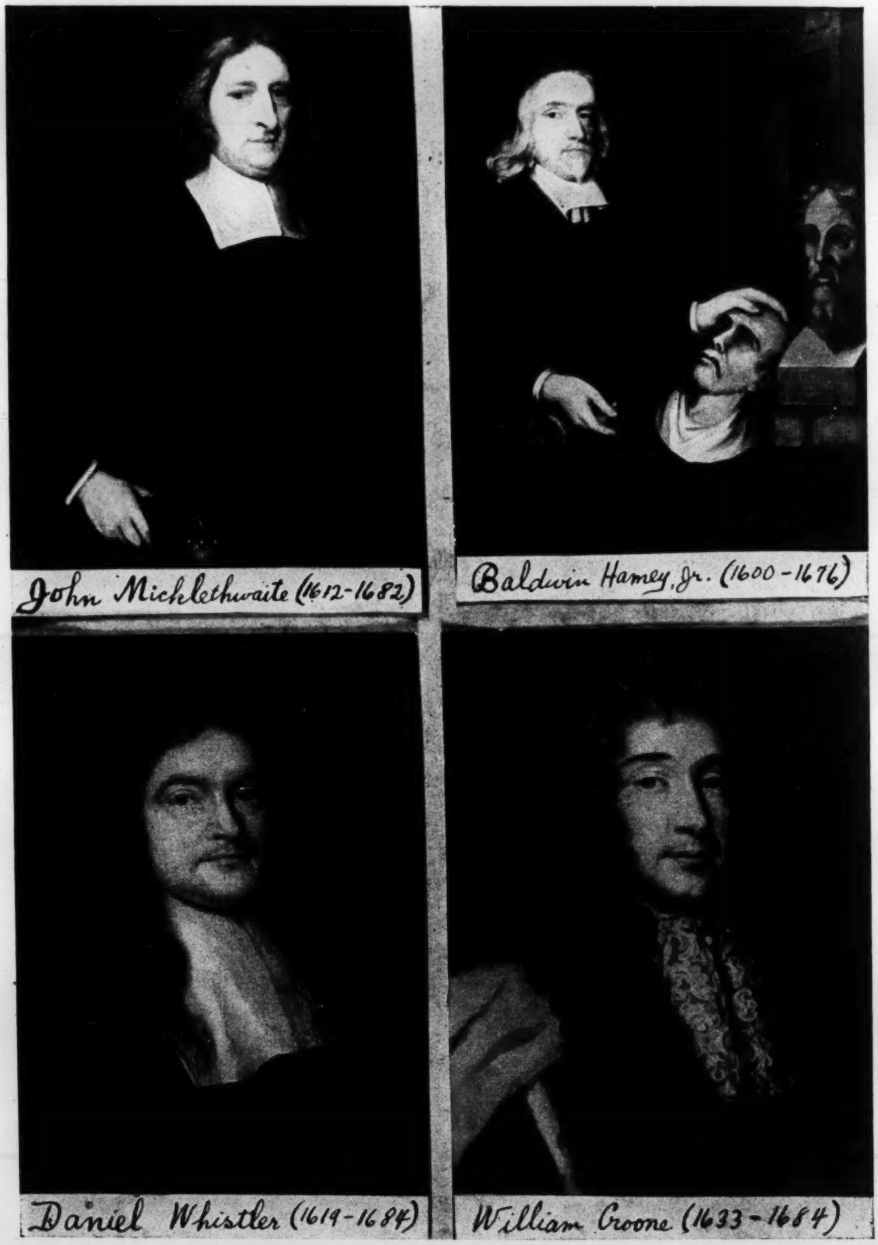

John Michlethwaite (1612-1682)
Baldwin Hamey, Jr. (1600-1676)
Daniel Whistler (1619-1684)
William Croone (1633-1684)

Fig. 8. Four Early Harveian Orators.

to the chair in the Jardin des Plantes by Louis XIV and taught the doctrine of the circulation, later writing "Anatomie de l'Homme Suivant la Circulation du Sang et les Nouvelles Découvertes" in 1690. But the first Frenchman to accept the circulation was J. Pecquet[31] of Dieppe in 1641.

Nathaniel Highmore (1616–1685), a scholar of Trinity College (elected 1632) and D. M. Oxon. in 1642, the year when Harvey came to Oxford after Edgehill, dedicated to him his first book "Corporis humani Disquisitio anatomica in quâ Sanguinis Circulationem prosequutus est" (1651), and thus gave the best account of his master's discovery that appeared in contemporary works of a systematic character. In Cambridge owing to the influence of Francis Glisson (1597–1677), who was Regius Professor of Physic (1636–77), Harvey's views were accorded a proper support; John Wallis (1616–1703), the famous mathematician who studied anatomy and medicine as well as metaphysics, ethics, and physics when at Emmanuel College between 1632 and 1640, was the first to maintain in a public dissertation the circulation of the blood, though he never had any intention of entering on "the physic line." Later with Glisson he was one of the "Invisible" or Philosophical College which met at Gresham College and in 1662 became the Royal Society. Henry Power (1623–68), whose only published work "Experimental Philosophy" (1663) was the first English book dealing with microscopical observations, was a loyal supporter of Harvey. He was of Christ's College, Cambridge, was in frequent scientific correspondence with Sir Thomas Browne, and was a Fellow of the Royal Society, being with Sir Justinian Isham the first elected Fellow of that body on 1 July 1663. I am much indebted to Dr. Charles Singer for a transcript of one of Power's unpublished papers (Sloane MS. 1343) in the British Museum, in which there is a section written during Harvey's lifetime in 1652 headed "Circulatio Sanguinis Harveiana inventa ab Authore An. Dom. 1614," thus somewhat antedating the discovery. He writes "amongst all the rabble of his (Harvey's) antagonists wee see not one that attempts to fight him at his own weapon, that is by sensible and anatomical evictions to confute that, which he has by sense and autopsy so vigorously confirmed." Power carried out and gives in detail a number of experiments on living animals to trace the course of the circulation and the action of the heart; he disproved the passage of the blood through the interventricular septum, confirms the pulmonary circulation, and by a process of logical exclusion after experiment was driven to assume the existence of capillaries, though he never saw them. He searched for, but could never find, any direct anastomosis between the arteries and the veins, in which Riolan, Cornelius ab Hogeland, Descartes, and Le Roy still believed.

In France, owing to the influence of Riolan seconded by Gui Patin, opposition to Harvey's views was more persistent than elsewhere; but before his death Harvey had the gratification of seeing that his discovery was gradually gaining general acceptance, especially in Holland and England. Molière's character of Thomas Diafoirus[32] in "Le Malade Imaginaire" (1673) was probably the last adversary of the doctrine of the circulation (Richet[33]), but it was not the last attack on Harvey; for a discordant note was sounded more than a hundred years later by the great William Hunter[34] (1718–1783) in his last days when in very poor bodily health. He remarked that the three great discoveries of modern times were the Western Hemisphere by Columbus, the constitution of the Solar System by Copernicus, and the circulation of the blood by Harvey, he gave first rank to Columbus, second to Copernicus, and depreciated Harvey on the ground that "so much had been discovered by others that little was left for Harvey but to dress it up into a system." But, as Herbert Spencer[35] remarks, this was probably written in a fit of temperamental contrariety, for elsewhere he speaks highly of Harvey. As already mentioned, Harvey's priority was attacked in 1876 by Ceradini on behalf of Cesalpinus.

Unfortunately Harvey did not live to see the final proof provided by the demonstration of the capillaries. In connection with Harvey's not having seen the capillaries it is interesting to quote D'Arcy Power[36] to the effect that a portrait of Harvey dated 1639 shows in the background a microscope identical with the form of the compound microscope figured by René Descartes in his "La Dioptrique," 1637. In 1661 Marcello Malpighi (1628-94), born in the year of the publication of the "De Motu," and therefore closely associated with this year's tercentenary celebration of the birth of physiology, utilized the microscope, probably invented in 1590 by Zacharias Joannides (Jansen) and his son of Middelburg, Holland, and thus saw the capillaries in the distended and in the dried lung of a frog, and also the red blood corpuscles, which, however, he regarded as fat cells. Antony van Leeuwenhoek[37] (1632–1723) of Delft, "the father of microscopy," observed the capillaries in living animals in 1674, and correctly described the contained red blood corpuscles, saying that "the blood consists of small round globules driven through a crystalline humidity of water," and that the small red globules were heavier than the crystalline water; Johannes Swammerdam (1637–80) of Amsterdam, also a pupil of Sylvius of Leyden, however, had seen the red blood cells as early as 1658 though his observation was not made public until 1738 when his "Bybel der Natuur (Biblia Naturae)" was brought out by Boerhaave. Leeuwenhoek[38] in an essay "On the Circulation of the blood; that it is not discoverable by sight in a human Body nor in the Bodies of terrestrial Animals; the same compleatly seen in Fishes, and the Nature of it particularly described" proved in 1688 the existence of the capillary circulation, which Harvey had deductively anticipated, by figuring the capillaries in the comb of a living young cock,[39] the ears of white rabbits, the wings of bats, in tadpoles, and the fins of small fish.

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# HARVEY'S EXPERIMENTS ON CIRCULATION[*]

*By* J. J. R. MACLEOD, M.D.

TORONTO, CANADA

WHEN the news of a great advance reaches us from the battle field, our joy is coupled with praise and applause, not only for the general who led the forces but also for those whose silent labours going on, often for long before, made the victory possible. And so it is in science. The discovery of the circulation of the blood was based on many preceding discoveries, but these would have been useless and long since forgotten, and blotted from the pages of history, had they not been coordinated, added to and reinterpreted in the light of a new theory which was then established beyond all risk of attack by new experimental proof. This it was that Harvey so admirably did, and it is my pleasant duty this evening to go over with you again the familiar pages on which, three centuries ago, he put his great work on record. It is, as it were, a Bible to the physiologist and physician and we can do honour to its author in no better way than by reading from its pages.

The first thirteen chapters of "De Motu Cordis et Sanguinis," present in admirable sequence the observations and experiments which prove that the blood is impelled in a circle around the body. This conclusion and all that it implies is restated in the fourteenth chapter, which, in Willis' translation reads as follows:

> Since all things, both argument and ocular demonstration, show that the blood passes through the lungs and heart by the force of the ventricles, and is sent for distribution to all parts of the body, where it makes its way into the veins and porosities of the flesh, and then flows by the veins from the circumference on every side to the centre, from the lesser to the greater veins, and is by them finally discharged into the vena cava and right auricle of the heart, and this in such a quantity or in such a flux and reflux thither by the arteries, hither by the veins, as cannot possibly be supplied by the ingesta, and is much greater than can be required for mere purposes of nutrition; it is absolutely necessary to conclude that the blood in the animal body is impelled in a circle, and is in a state of ceaseless motion; that this is the act or function which the heart performs by means of its pulse; and that it is the sole and only end of the motion and contraction of the heart.

We can scarcely realize the true significance of these few words until we contrast the conception of the circulation which they so clearly define with the obscure and fantastic one which it replaced. The blood, so Galen taught, originates in the liver where it is produced through the influence of this organ acting on the food absorbed into the vena porta from the alimentary canal. This is crude blood, endowed only with natural spirits, and it is carried through the vena cava to the right side of the heart, between which and the great veins it then ebbs and flows so as to supply the tissues with the lower requirements of nutrition, some passing in like manner to the lungs by way of the artery-like vein (the pulmonary artery). But all of the crude blood does not behave in this manner; some passes through invisible pores in the septum into the left ventricle, where under the influence of the innate heat of the heart it becomes endowed with vital spirits, and then, as vitalized (arterial) blood, flows through the arteries to supply the tissues with the higher (vital) requirements of their nutrition, and the ventricles of the brain with blood, so that with the addition of air, the animal spirits, highest of all, may be prepared, which then distil throughout the body by way of the nerves. In order to cool and temper the vitalizing fire which is lighted in the heart at birth and burns there until death, air drawn in from the lungs is carried to the left ventricle with the ebb tide of the blood through the vein-like arteries (pulmonary veins), and with its flow the fuliginous vapours engendered by the combustion are carried to the lungs.

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[*] An address delivered at the tercentenary celebration of the publication of Harvey's book on the circulation of the blood by the College of Physicans, Philadelphia, March 22–23, 1928.

Now, besides the fundamental difference between the old and the new viewpoints, expressed in words by "ebb and flow" and "circulation," there are at least two assumptions in the Galenic teaching with which Harvey had to deal, the one, that there are invisible pores in the septum and the other, that a life long, vital fire burns in the left ventricle. The former of these Harvey cast aside as unnecessary, aided no doubt in his decision by the works of his predecessors, Columbus, Cesalpinus and perhaps even Michael Servetus; the latter he still clung to, for he believed with Aristotle:

> There must be a particular seat and fountain, a kind of home and hearth, where the cherisher of nature, the original of the native fire is stored and preserved; from which heat and life are dispensed to all parts as from a fountain head . . . Now, that the heart is this place, . . . I trust no one will deny.

He conceived an important duty of the circulating blood to be the conveyance of heat from the heart to the peripheral parts of the body and, with this conception in mind, he still followed the ancients in imagining that the air which enters the lungs serves to cool and temper the vital fires of the heart.

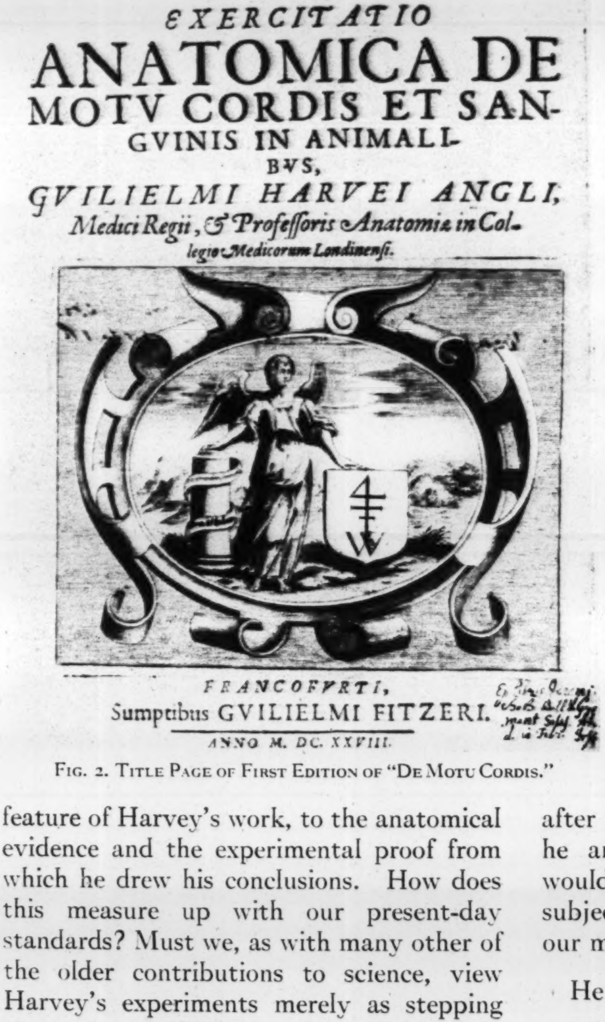
When arguing that the blood must pass from the right to the left chambers of the heart by way of the pulmonary vessels, he writes, in the sixth chapter:

> Nature has (rather) chosen to make the blood percolate the parenchyma of the lungs . . . in order that it may be tempered by the air that is inspired, and prevented from boiling up, and so becoming extinguished, or something else of the sort.

But a note of scepticism is I think quite evident in these words. No one had ever conceived of any other possible source for the heat of the body than the viscera, especially the heart, for not only was the nature of fire itself a complete mystery, but even van Helmont's idea that the tissues were the kitchens of the body was as yet unborn and Harvey was compelled to accept the Aristotelian viewpoint. He had ventured just as far as he dared in the light of observation and experiment, and he was too astute to jeopardize the acceptance of his main thesis by theoretical discussion of a problem which that light could not illumine.

FIG. 1. EARLY PORTRAIT OF HARVEY IN OILS, SAID TO BE BY OR AFTER RUBENS.

I have directed your attention to these unfinished portions of the picture which Harvey gave us because I consider that they add to, rather than detract from, its priceless value. Like a great artist he was primarily concerned in conveying a message of truth, and he dared not allow this to lose its prominence in the picture by unconvincing argument over details which he could not clearly see in the then dim light of scientific knowledge.



EXERCITATIO
ANATOMICA DE
MOTV CORDIS ET SAN-
GVINIS IN ANIMALI-
BVS,
GVILIELMI HARVEI ANGLI,
Medici Regii, & Professoris Anatomiæ in Col-
legio Medicorum Londinensi.

FRANCOFVRTI,
Sumptibus GVILIELMI FITZERI.
ANNO M. DC. XXVIII.

FIG. 2. TITLE PAGE OF FIRST EDITION OF "DE MOTU CORDIS."

And now I come to the most outstanding feature of Harvey's work, to the anatomical evidence and the experimental proof from which he drew his conclusions. How does this measure up with our present-day standards? Must we, as with many other of the older contributions to science, view Harvey's experiments merely as stepping stones to something better, or are they final and beyond improvement or modification? I can best answer these questions by stating that I know of no system of practical instruction in the physiology of the circulation which compares in excellence with that which is sufficiently outlined in the chapters of Harvey's book, from the second to the thirteenth. Indeed I am of the opinion that were we to do little more than require our students of medicine of today to repeat, step by step and in their sequence, each of the dissections and experiments as laid down in "De Motu Cordis et Sanguinis" we should train them, in a general way, better than at present to think out for themselves the problems of the circulation. Other facts about the heart and circulation that Harvey never dreamed of would obviously have to be learned, but the method not only of supplying proof by observation and experiment, but also of thinking, would make the acquisition of these new facts an easy task.

The brevity of Harvey's treatise, and the apparent facility with which appropriate proof is found for each new fact as it is stated, may give the impression that his discoveries were revealed to him by some sort of Divine inspiration, rather than being what they were, the outcome of the most patient and repeated research, both anatomical and experimental, made upon animals from the lowliest which he could examine, upwards through the scale, to man himself. Eclectic in his methods, Harvey made use of knowledge from whatever source. Everything that could possibly aid him in his search after truth was called into play, and were he among us today, I imagine that he would deride with scorn the dissociation into subjects, the specialization, which features our medical teaching.

He writes at the beginning of the book:

> When I first gave my mind to vivisections, as a means of discovering the motions and uses of the heart, and sought to discover these from actual inspection, and not from the writings of others, I found the task so truly arduous, so full of difficulties, that I was almost tempted to think, with Fracastorius, that the motion of the heart was only to be comprehended by God.

And then, a little further on:

At length, and by using greater and daily diligence and investigation, making frequent inspection of many and various animals, and collating numerous observations, I thought that I had attained to the truth, that I should extricate myself and escape from this labyrinth, and that I had discovered what I so much desired, both the motion and the use of the heart and arteries.

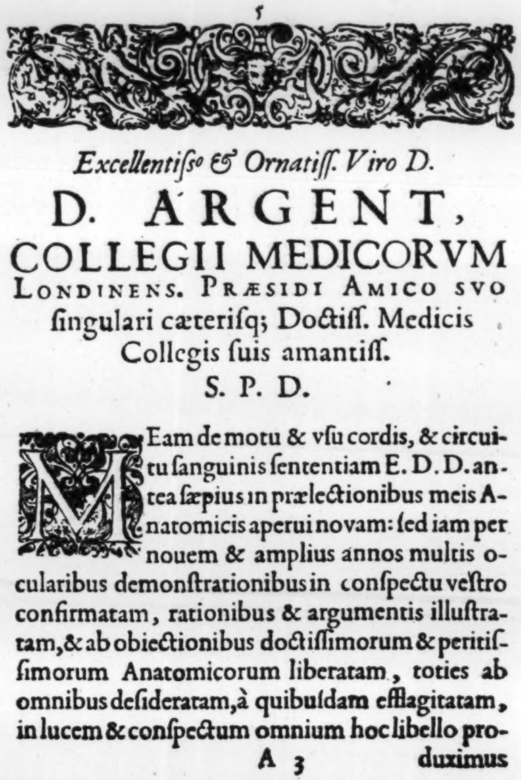
But with all his success he did not lose the modesty of the true inquirer of nature; the more her secrets were revealed to him the more clearly did he see that beyond were multitudes of other problems, and he ends the first chapter with the verse:

For never yet hath any one attained
To such perfection, but that time, and place,
And use, have brought addition to his knowledge;
Or made correction, or admonished him,
That he was ignorant of much which he
Had thought he knew; or led him to reject
What he had once esteemed of highest price.

The first problem to be attacked concerned the motions of the heart. How could he, "by reason of the rapidity of these motions" "rightly perceive at first when the systole and when the diastole took place"? Was Galen right in stating that "when the heart strikes the breast and the pulse is felt without, it is dilated in its ventricles and is filled with blood"? Do the arteries and the heart both dilate at the same time? To wring these secrets from the heart its movements had to be examined when they were "slower and rarer" than in the higher animals, and this Harvey found to be the case "in the colder animals, such as toads, frogs, serpents, small fishes, crabs, shrimps, snails and shell-fish," as well as in "warm-blooded animals, such as the dog and hog if they be attentively noted when the heart begins to flag . . . " I need not here quote what Harvey then describes, his final conclusion being:

> [The heart] becomes erect, hard, and of diminished size during its action; the motion is plainly of the same nature as that of the muscles when they contract . . . it is at once constricted on all sides . . . [so that] by squeezing out the blood it contains it becomes paler, and when it sinks into repose and the ventricle is filled anew with blood . . . the deeper colour returns.

Having demonstrated the true nature of the motion of the heart and exposed the falsity of the "opinions commonly received" Harvey then leads us to the motions and pulses of the arteries:



*Excellentiſſ$^{o}$ & Ornatiſſ. Viro D.*
D. ARGENT,
COLLEGII MEDICORVM
LONDINENS. PRÆSIDI AMICO SVO
ſingulari cæteriſq; Doctiſſ. Medicis
Collegis ſuis amantiſſ.
S. P. D.

MEam de motu & vſu cordis, & circuitu ſanguinis ſententiam E. D. D. antea ſæpius in prælectionibus meis Anatomicis aperui novam: ſed iam per nouem & amplius annos multis ocularibus demonſtrationibus in conſpectu veſtro confirmatam, rationibus & argumentis illuſtratam, & ab obiectionibus doctiſſimorum & peritiſſimorum Anatomicorum liberatam, toties ab omnibus deſideratam, à quibuſdam efflagitatam, in lucem & conſpectum omnium hoc libello pro-
A 3 duximus

FIG. 3. PREFACE OF "DE MOTU CORDIS."

> At the moment the heart contracts and when the breast is struck, when in short the organ is in its state of systole, the arteries are dilated, yield a pulse and are in a state of diastole [and] when an artery is divided or punctured the blood is seen to be forcibly propelled from the wound at the moment the left ventricle contracts.

The then current notion that heart and arteries contract and dilate together is thus overthrown, and Aristotle's observation that, "the blood of all animals palpitates within their veins (meaning the arteries) and by the pulse is sent everywhere simultaneously," is given its true meaning.

These relationships between the movements of the heart and arteries established, Harvey returns to a more particular analysis of the sequence and purpose of the former. By observing the dying heart of mammals, and the heart of fishes, he brought to light two supremely important facts, namely, that the motion of the auricles precedes that of the ventricles and that the pulsations depend on a property of the cardiac muscle itself. If the heart of the eel be cut in pieces he says the several parts may still be seen pulsating and palpitating. He forestalls the modern teaching that "the auricle is the pacemaker of the heartbeat," that it dominates the ventricular beat. And then he discusses the purpose of this sequence of beating; the auricle contracts first, so that "the blood enters the ventricles, not by any attraction or dilatation of the heart, but by being thrown into them by the pulses of the auricles." The ventricles do not become filled with blood by dilating like a sponge after it has been squeezed but passively, by blood propelled into them by contraction of the auricles, for "if . . . the point of the heart [ventricle] be cut off with a pair of scissors" when the auricles are alone pulsating (as in a dying heart), "you will perceive the blood flowing out upon each contraction of the auricles."

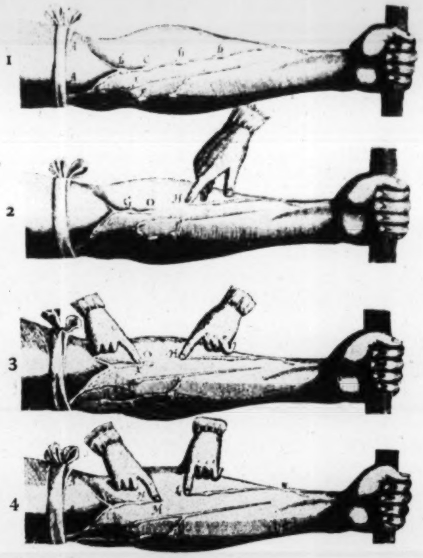
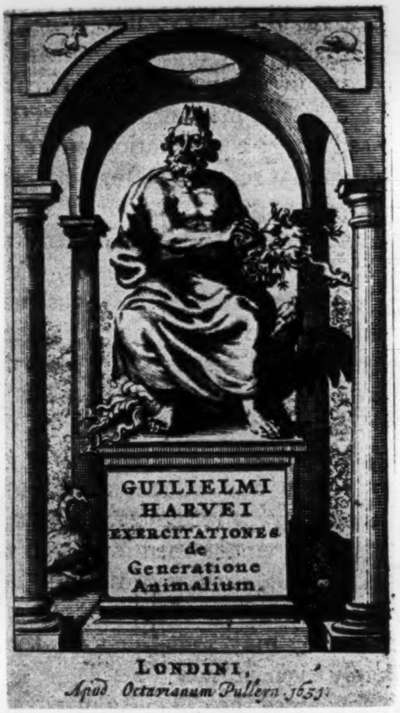


Fig. 4. Harvey's Four Figures Illustrating Experiments on the Direction of the Blood Flow in the Veins.

Fig. 5. Engraving of Harvey's Demonstration to King Charles I.

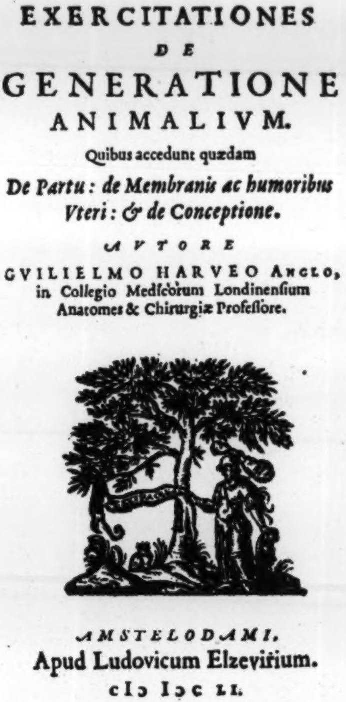
Impressed with the persistence of beating in the auricles, or rather, as he says in "the part which corresponds to the auricles in serpents, fishes etc.," Harvey enters into a discussion of the "*primum vivens*" and the "*ultimum moriens*." It is not the heart as a whole but the auricles which "live before the heart and die after it"; and perhaps it is even deeper down, as it were, and resident in the blood itself for he "occasionally observed after the heart, and even the right auricle, had ceased pulsating . . . that an obscure motion, an undulation or palpitation, remained in the blood itself which was contained in the right auricle." He also repeatedly refers to the fact, as Aristotle had before him that in the chick embryo "a drop of blood makes its appearance [during the first 7 days of incubation] which palpitates," and from which "as the growth is further advanced and the chick is fashioned, the auricles of the heart are formed . . . " Here, I think, Harvey is making an attempt to harmonize the then prevailing muddled ideas of the innate heat of the blood with the remarkably clear analysis which he had achieved of the motions of the heart. Aristotle had taught the primacy of the heart; Harvey, though his disciple in most things, taught the primacy of the blood. Even in his earliest lecture notes, in 1616, are passages which are not in accord with the ancient philosopher's teaching. "The soul is in the blood," he writes, and again "because of the abundance of blood and spirits in the ventricles whence the fount of the entire heat . . and whence the auricles pulsate, after removal of the heart because of the multitudinous blood." And in his last publication in 1651 he finally decides that "pulsation is begun in and by the blood, so at last it ends in the blood at the final instant of death" (On Generation). He never questions Aristotle's doctrine, that the first part to live is always the last part of the body to die. Curtis in his scholarly analysis of the views of Harvey considers that filbrillation of the auricular walls misled him into thinking of "an obscure motion and flow" of the blood itself, a notion which was confirmed in his mind by the "leaping point" of blood in the embryonic chick.



GUILIELMI
HARVEI
EXERCITATIONES
de
Generatione
Animalium.

LONDINI,
Apud Octavianum Pulleyn 1651.

FIG. 6. TITLE PAGE OF PULLEYNS' EDITION OF HARVEY'S "DE GENERATIONE ANIMALIUM."



EXERCITATIONES
DE
GENERATIONE
ANIMALIVM.
Quibus accedunt quædam
*De Partu: de Membranis ac humoribus*
*Vteri: & de Conceptione.*
*AVTORE*
GVILIELMO HARVEO ANGLO,
in Collegio Medicorum Londinenſium
Anatomes & Chirurgiæ Profeſſore.

*AMSTELODAMI,*
Apud Ludovicum Elzevirium.
cIↄ Iↄc LI.

FIG. 7. TITLE PAGE OF THE ELZEVIR EDITION OF HARVEY'S "DE GENERATIONE ANIMALIUM."

But we must return to the experimental proof of the circulation of the blood. Having concluded that the blood is propelled from auricles to ventricles, and thence through the arteries to the body, it remained to explain how it is transferred from the right to the left side of the heart. Herein was the great puzzle of the circulation, "the grand cause of doubt and error":

> When men saw both the pulmonary artery and the pulmonary veins losing themselves in the lungs, of course it became a puzzle to them to know how, or by what means, the right ventricle should distribute blood to the body or the left draw it from the venae cavae.

Then, in the sixth and seventh chapters it is shown, first of all by dissections and vivisections on lower animals and then by consideration of the course of the blood in the fetus of the higher ones, how in man the blood must pass through the substance of the lungs from the right ventricle of the heart into the pulmonary veins and left ventricle:

> Had anatomists [he writes] only been as conversant with the dissection of the lower animals as they are with that of the human body, the matters which have hitherto kept them in a perplexity of doubt would in my opinion have left them freed from every kind of difficulty.

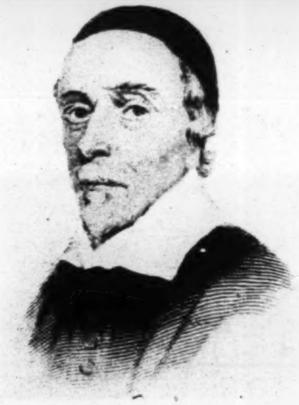


Fig. 8. Portrait of Harvey in Skull Cap.

He begins with fishes in which, the lungs being absent, the heart consists of but a single ventricle into which the blood is projected by the contraction of a sac, representing the auricle, situated at its base, whence it is propelled by each pulsation of the heart into a pipe analogous to an artery. A little higher in the animal scale, in toads, frogs, serpents and lizards, lungs appear and into these "anatomical dissection plainly shows that the blood is transferred . . . by the action of the heart," which, in having but one ventricle acts precisely as it would in man if the septum were removed. Then follows a discussion of the human fetal circulation in which it is shown, by observing the free pathways to blood flow afforded by the foramen ovale and ductus arteriosus and the blocked ones when the valves at the foramen ovale and large arteries are closed, that most of the blood does not enter the lungs:

> In embryos, consequently, whilst the lungs are yet in a state of inaction . . . the heart by its action transfers the blood from the vena cava into the aorta . . . as if in the adult the two ventricles were made to communicate by removal of their septum.

Here is a classical example of the value of comparative physiology; first fishes, then toads and serpents, then the human fetus, all showing a similar type of circulation associated with a more or less undeveloped, or unused lung; a circulation entirely different from that set going after birth in man. Why should nature "close up the various open routes which she had formerly made use of in the embryo and foetus, and still uses in all other animals"? It must be "in order that it [the blood] may be tempered by the air that is inspired." It must circulate through the parenchyma of the lungs in adult animals, because the more direct passages previously open to it by way of the foramen ovale and ductus arteriosus are now closed. Harvey recognized that the fetal openings may remain open in certain warm blooded animals, such as geese and "in one of the larger members of the mouse family," and that they may sometimes fail to close completely even in man himself.

But now arose the difficulty of explaining how the blood could pass continuously from the pulmonary artery through the lungs into the pulmonary veins. There were no visible anastomoses between these two vessels in the lungs, and capillaries were unknown. Harvey's attack on this problem was an indirect one; he had, as it were, to outflank the difficult position which the enemy to progress still held because it had to be shown that the whole mass of blood of the body passes through the substance of the lungs "even as the nutritive juices percolate the liver." The last sentence indicates the direction of the attack. When large amounts of liquid are imbibed all "passes off again within an hour or two by the bladder" and must therefore percolate the liver, and carried by the veins (blood vessels), must pass through the kidneys into the ureters and bladder. But the substance of these organs is extremely dense, whereas "the lungs are of a much looser texture and if compared with the kidneys are absolutely spongy." In the liver, moreover, there is no impelling on (of the blood); in the lungs it is forced on by the pulse of the right ventricle. "And then the lungs in respiration are perpetually rising and falling; motions, the effect of which must needs be to open and shut the pores to vessels precisely as in the case of a sponge."

He then calls to his assistance the authority of Columbus with regard to the fullness of the pulmonary veins with blood after death, and of Galen concerning the uses of the valves of the heart and blood vessels. But whereas the latter, having regard only to the two sets of valves in the right heart had only concerned himself with "the transit of the blood . . . from the vena cava through the ventricles into the lungs," Harvey, having regard to those of the left heart as well, concluded "that the blood is incessantly sent from the right ventricle into the lungs by the pulmonary artery and in like manner is incessantly drawn from the lungs into the left ventricle," so that "it cannot do otherwise than pass through continuously." Then, in summing up these arguments in the last paragraph of the seventh chapter, he writes:

> It therefore appears that although one ventricle of the heart, the left to wit, would suffice for the distribution of blood over the body, and its eduction from the vena cava, as indeed is done in those creatures that have no lungs, nature, nevertheless, when she ordained that the same blood should also percolate the lungs saw herself obliged to add the right ventricle, the pulse of which should force the blood from the vena cava through the lungs into the cavity of the left ventricle.

The right ventricle is made for the transmission of blood through the lungs and not as the ancient teaching was, merely for their nutrition.

The new position having been gained, everything was now in place to launch the grand attack on the old doctrines of the ebb and flow of the blood in the arteries and veins. Here the attack must venture forth with no more assistance or guidance from the work of preceding anatomists than that offered by Fabricius concerning the valves in the veins. Men's minds were to some extent prepared to receive the new teaching in so far as concerned the pulmonary circulation, for had not even Vesalius, influenced perhaps by Servetus' writings, cast some doubt on the supposed existence of pores in the septum; and had not Columbus, reflecting, it is thought, the teachings of others actually declared the passage of blood through the pulmonary circuit? "But what remains to be said upon the quantity and source of the blood which thus passes is of a character so novel and unheard of" that Harvey feared that he should have "mankind at large for his enemies . . . Doctrine once sown strikes deep its root and respect for antiquity influences all men."

Reflecting on his numerous studies of the ventricles, of the large vessels, the relative thickness of their walls and on the disposition of the valves of the heart:

> [He asked himself] what might be the quantity of blood which was transmitted, in how short a time its passage might be effected and the like. [The volume of blood could not be supplied from the ingested aliment] without the veins on the one hand becoming drained and the arteries on the other getting ruptured through the excessive charge of blood, unless the blood should somehow find its way from the arteries into the veins and so return to the right side of the heart; I began to think whether there might not be A MOTION, AS IT WERE, IN A CIRCLE.

With what follows in the eighth chapter about the heart being the sun of the microcosm, the source of heat for the blood and body, we need not here concern ourselves. Of much greater importance are the proofs presented in the succeeding five chapters. Three propositions had to be considered, the first that "the blood is incessantly transmitted by the action of the heart from the vena cava to the arteries in such quantity that it cannot be supplied from the ingesta," the second, that the blood is impelled by the arterial pulse through every part and member of the body and the third, that the veins return this blood incessantly to the heart.

First, then, Harvey had to show that the quantity of blood thrown into the aorta is far in excess of what could possibly come from the ingesta and this he proceeds to do by quantitative methods. Having found that the left ventricle when distended after death holds upwards of two ounces of blood and assuming, for sake of argument, "that but the eighth part of its charge is thrown into the artery" then at least one drachm of blood must be "propelled by the heart at each pulse into the aorta" and, multiplying this by the number of beats in a given period of time, say 1000 in half an hour, we shall have 1000 drachms, which is a larger quantity, even on this absurdly low estimate, "than is contained in the whole body." "Upon this supposition, therefore, assumed merely as a ground for reasoning, we see the whole mass of the blood passing through the heart from the veins to the arteries and in like manner through the lungs." In this method of attack we see that Harvey left no loophole through which his critics might assail his position. Would he not have been surprised if he had known, as we do now, that nearly thirty times a drachm of blood is thrown into the aorta with each contraction of the heart and that the very largest amount which he mentions, two ounces, would still have been but little more than one-half that actually ejected. But he is careful to point out that the quantity of blood being circulated is not always the same for he says: "the blood is transfused at one time in large, at another in smaller quantity . . . now more rapidly now more slowly according to the temperament, age etc. of the individual" and he recognized that rest and exercise and food have potent influences.

And then follows the corollary, if the blood thus circulates then it must soon all be drained out of the body by opening a vessel. This need not be the great artery, the aorta, but a very small branch only and the blood "spouts forth with force abundantly, impetuously and as if it were propelled by a syringe" whereas when a vein is opened but very little blood is poured out, because its walls collapse and there is no propelling power. Moreover when an artery only is opened the veins become emptied of blood coming through the heart but "if the aorta be tied at the base of the heart and the carotid or any other artery be opened no one will now be surprised to find it empty and the veins only full up with blood." Then finally this all harmonizes with the long known fact that the arteries are empty and the veins replete with blood after death, for:

> The heart not ceasing to act at the same precise moment as the lungs, but surviving them and continuing to pulsate for a time the left ventricle and arteries go on distributing their blood to the body at large and sending it into the veins; receiving none from the lungs, however they are soon exhausted and left, as it were, empty.

In the tenth chapter an experiment is described which every student of medicine should be made to perform. When the vena cava of a snake is occluded the part that intervenes between (the occlusion) and the heart almost immediately becomes empty, the blood being exhausted by the action of the heart which itself becomes paler, even when it is dilated, is smaller and at last begins to beat more slowly as if it were about to die. Remove the obstruction:

> [And] instantly the colour and size of the heart are restored . . . If on the contrary the artery instead of the vein be compressed or tied you will perceive the part between the obstacle and the heart and the heart itself to become immediately distended, to assume a deep purple or even livid colour . . . but the obstacle removed, all things immediately return to their natural state in colour, size and impulse.

The proof for the second proposition, that the blood is carried throughout the body by the arterial pulse, is likewise furnished by experiments well worthy of repetition in our practical classes, demonstrating the effects of ligatures:

> Let a ligature be thrown about the extremity [preferably of a lean man with large veins and after exercise], and drawn as tightly as can be borne, it will first be perceived that beyond the ligature . . . the arteries cease to pulsate . . . whereas immediately above the ligature . . . the artery appears as if it were preternaturally full. The hand, retaining at first its natural colour and appearance in the course of time begins to fall somewhat in its temperature . . . [Now let the ligature be partially slackened, to the tension used in blood letting, and] it will be seen that the whole hand and arm will instantly become deeply coloured and distended and the veins show themselves turgid and knotted [and] if the finger be applied over the artery as it is pulsating by the edge of the fillet, at the moment of slackening it, the blood will be felt to glide through, as it were, underneath the finger; and he, too, upon whose arm the experiment is made, when the ligature is slackened, is distinctly conscious of a sensation of warmth and of something making its way along the course of the vessels and diffusing itself through the hand.

We need not occupy our time with further reference to these experiments, so easily understood nowadays, except to show how Harvey used them to prove that the arterial blood passes into the veins by certain porosities hidden in the tissues. The blood, he concludes, cannot flow into the arm by the veins when a ligature of medium tightness is applied, because the blood cannot be forced towards the heart until the ligature is removed when suddenly all the veins collapse:

> [The subject] is aware of something cold making its way upward along with the returning blood and reaching the elbow or the axilla . . . Farther when we see the veins below the ligature instantly swell up and become gorged when, from extreme tightness, it is somewhat relaxed, the arteries meantime continuing unaffected this is an obvious indication that the blood passes from the arteries into the veins and not from the veins into the arteries and that there is either an anastomosis of the two orders of vessels or porosities in the flesh and solid parts generally that are permeable to the blood.

A great merit of Harvey's researches lay in the admirable correlation of the purely experimental and the clinical. He did not, like so many of his time, seek for some pseudoscientific explanation for disease, he was no schoolman with a favourite hypothesis to defend, with a panacea for all ills. Although neither an iatrophysicist nor an iatrochemist he nevertheless lost no opportunity to point out the application in the practice of medicine of what his researches had revealed to him. We can find no better example of this feature of Harvey's work than the application in the practice of phlebotomy of the principles we have just reviewed. Thus, he points out that sudden failure of blood to flow freely from the opened vein, the ligature being nevertheless applied with the proper degree of tightness is due to languid pulsation of the heart, occasioned perhaps by some alarm, the reason being "that with some greater than usual resistance offered to the transit of blood by the bandage coupled with the weaker action of the heart, and its diminished impelling power the stream cannot make its way under the ligature." He never actually speaks of blood pressure, it was not until nearly a century later that Stephen Hales demonstrated this, but Harvey realized that it existed (impelling power) and that its insufficiency was the cause of fainting.

To prove the third proposition, that the blood finds its way back to the heart from the periphery by the veins, Harvey made use of his old Paduan teacher's discoveries of the valves of the veins. He first of all reviews Fabricius' description of the arrangement and disposition of the valves and then points out that they could not, as their discoverer had imagined, exist merely for the purpose of hindering the blood from flowing by gravity into inferior parts, because "the edges of the valves in the jugular veins hang downwards and are so contrived that they prevent the blood from rising upwards" nor could the effects of gravity be invoked to explain the disposition of many of the valves in the veins of quadrupeds. "But the valves are solely made and instituted lest the blood should pass from the greater into the lesser veins." A probe can readily be pushed past the valves when it is directed from the smaller branches towards the trunk of the veins but not in the opposite direction. "The effect of this arrangement plainly is to prevent all motion of the blood from the heart and vena cava whether it be upwards towards the head or downwards towards the feet."

But Harvey never based his proof on anatomical reasoning alone; however compelling this might be, it was always supplemented by experimental evidence. In the present instance this consisted in an admirable series of simple experiments performed on the veins of the forearm after applying a ligature at the elbow. You are doubtless all familiar with the famous figures illustrating these experiments, the first one shows the valvular bulgings and their frequent relationship to the branchings, the second how the vein disappears from view when with one finger compressing it below the blood is pressed upwards till a valve is reached, the third, how downward pressure on the distended vein above this valve serves only to make the portion of the vein between the finger and the valve become more distended and the last, how the obliterated portion of vein refills instantly with blood when the lowermost finger is withdrawn. And even by the use of simple experiments of this type Harvey shows how one may arrive at an estimate of the amount of blood flowing in the vessels:

> [He says] compute the quantity of blood which you have pressed up beyond the valve [by repeating the second and fourth of the experiments] and then multiplying the assumed quantity by one thousand, you will find that so much blood has passed through a certain portion of the vessel; and I do now believe that you will find yourself convinced of the circulation of the blood and of its rapid motion.

[Boyle: Opera Omnia. Venetiis, 1697.]

# AN INTRODUCTION TO THE STUDY OF PHYSIC BY WILLIAM HEBERDEN, M.D.*

*By* LE ROY CRUMMER, M.D.

OMAHA

Scire potestates herbarum, usumque medendi
Maluit, et mutas agitare inglorius artes.
On. c 12
Phoebe, fave, novus ingreditur tua templa sacerdos.
Vir multis mihi nominibus charissimus
Gulielmus Heberden; qui ad artis medicinae studia qua quidem egregie praestat, literas eas omnes reconditiores, atque ea humanitatis studia adjuncta quae hominem ingenuum ornare suisque jucundum reddere queabit.
Middleton
I'ητρὸς γάρ ἀνήρ πολλων ἀυλώξιος ἰλλων—Hom
Nunc, dea, nunc succurre mihi, nam prope mederi
Picta docet templis, multis tabella tuis.
Tib:c:1.ee:3.

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### PREFACE

There are several books extant written with the design of directing beginners in the study of physic, how they are to proceed in order to become masters of their profession; tho' the design is admirably executed in some of these peices for the time in which they were written, yet these writers as well as those they recommend are become in a great measure obsolete. For there have been such improvements made by the diligence and success of modern physicians, that it would be time lost to read over many of those authors, who were justly recommended in the last century as the capital ones in their respective subjects. Hence appears the necessity of new directions of this kind, and it is to be wished for, that these may share the fate of the former, and that every celebrated author may be eclipsed by the superior excellence of succeeding physicians.

William Heberden.

## CHAP. 1

### OF INTRODUCTORY BOOKS

WHOEVER then devotes himself to this useful study & would make the greatest advantage of this short life in the pursuit of so extensive an art, should first take a view of its rise & progress and present state. But, I should premise, he is supposed to come to this study sufficiently versed in the Latin & Greek & able to read over one or two modern languages. And tho' his character as a scholar (for every physician is expected to be such) besides his acquaintance with the antient classical writers, requires that he should not be ignorant of geography, chronology, history, logic, metaphysics, ethics, mathematics and natural philosophy; yet of all these the two last demand his especial attention, if he would be secure from error, & superstition, from mistaken theories and ill grounded practice. Thus prepared then let him take a general survey of the ancient and present state of physic, in doing which he will be greatly assisted by that great book of Daniel le Clerc, entitled Histoire de Medicine, in which is given a full and distinct account of it's origin and various revolutions, as likewise of all the authors & their books or opinions from the beginning of the world to the time of Galen, with whom he ends, who flourished in the second century. It must be confessed that this work is more curious than useful, and for one who has no great taste for phylology, but is in haste to acquire something more substantial it will appear perhaps tedious. For the benefit of some it were to be wished there was a judicious abridgement made of this performance. Dr Friend [Freind] has continued on this history down to the time of Linacre who founded the college of physicians during the reign of Hen. 8th. Lexicons are the next things or perhaps the first things with which he should furnish himself. Two will be necessary;—Gorraus's definitiones medicae, or rather the last edition of Barthot Castellus' lexicon, either of which will serve for an explication of the more learned terms of the antient physicians; & Quincy's Lexicon for the modern. It was said that many had written on the subject of directing beginners in the study of physic: among these "Coringii" [Conringius] Introd. ad universam artem medicam is a most useful book & is well worth being read over: the benefit to be reaped from it is, that it will supply the deficiences of the above mentioned histories, by giving a judicious & accurate account of every writer of note down to the time in which it was written, viz, the beginning of the last century. Schelthammer has much enriched this book by his notes & addition of a few short peices on the same argument. The last edition of 1726 has a preface by Hoffman with a breif account of some more modern authors. There is another useful introductory book—Lindenius renovatus de scriptis medicis, published by Inerchlinus with large additions in the year 1686. In this book are mentioned all the editions of every medical treatise written in Greek, Latin or Arabic down to the year in which it was published, with a short history of the lives of some of the authors. (The advantage of knowing the editions of books, their dates and improvements on one another is acknowledged by all men of letters.) But besides this, there is a most useful index at the end of this work in which if you look for any medical subject, you will see all the authors enumerated that have ever written upon it. There are two faults to be found with this book, the one born with it, the other the effect of old age; for his alphabetical order consists not of the nomen but the praenomen: for instance, one must not look out for Galenus but Claudius, not for Sydenham but Thomas, which frequently puts us to the inconvenience of consulting an index to know the authors praenomen before we can find an account of his works. The other fault is self-evident which must of course attend a book of this sort, published about 50 years ago; at a time too that has been so fruitful of new authors, as well as of new editions of old ones. Mangetus published 2 Vol. in folio called the Bibliotheca Scriptorum med: in the year 1731 where both these failings are remedied, and he further excells Lindenius in giving fuller histories of his authors' lives, opinions and writings; as also in taking notice of such books as are written in the modern as well as learned languages: but in my opinion he has committed a greater fault than any he has remedied by omitting that useful index, that was commended in Lindenius.

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*Prefatory Essay to "An Introduction to the Study of Physic by William Heberden" by LeRoy Crummer, appeared in ANNALS OF MEDICAL HISTORY Vol. x, No. 3, p. 226.

## CHAP. 2

## ON BOTANY

Botany and chemistry are a sort of frontier studies, that we must necessarily stop at, before we proceed any farther into physic. They were once wholly subject to the physician's jurisdiction, but like thriving provinces they are of late so much enriched, that they have almost thrown off their allegiance and set up for independent studies. Something however of botany is expected in a physician, and enough may be learned by an acquaintance with Ray's method, which is explained in a book entitled Raii methodus plantarum emendata et aucta &c, Lond: 1703, and Tournefourts method given in his institutions rei Medicae. If to this be added Raii synopsis methodica stirpium Britan, Ed: tert: I think they will read the whole which a physician needs to trouble himself with, especially for some time. It is not possible he should be a compleat botanist, for this would employ a man his whole life. It will suffice, if he knows at sight most of the common plants and all the medical ones. He must understand the technical terms used by botanists and be so much master of their method as to be able to consult books of botany upon any occasion, & to understand their descriptions. But beside these some assistance is wanted from a living master otherwise it would be tedious & almost impossible to make any progress. I am far from desiring that the narrow bounds I have set to botany should be strictly kept, as if the physician was to be lost whenever he surpassed them; on the contrary I think that every man will be often led to consult that useful history of plants by Mr. Ray in 3 vol. fol. & sometimes the books of other botanists. But I would be only understood to point out those books a young student should begin with & cannot well do without. After he has duly considered these he will easily find out others to guide him as far as he pleases. Nor would I discourage him from expatiating further in this delightful field. I rather think him to be commended for not sitting down contented with a beggarly sufficiency; and if his time is judiciously laid out & well husbanded, he will be at liberty to pursue this part of knowledge, either for his own ornament or amusement without any detriment to his profession. But I must desire him never to forget that his proper business is to understand the history of diseases and to know what will prevent, cure or palliate them in the best manner. All studies therefore are beside his purpose that do not lead to this end. Of this he must never lose sight but always be upon for fear he should be drawn away after any engaging parts of learning farther than is consistent with his main design.

He must own that this may easily happen in botany when he reflects how many thousand plants the modern botanists are possessed of, out of which our pharmacopoeias do not pretend to have any claim to more than five hundred, and of these scarce a fourth part are used.*

## CHAP. 3

## OF CHEMISTRY

Chemistry is of late so much enlarged, extending not only to natural philosophy, but even to a great number of mechanical arts, that it is necessary here, as well as in botany, when we are teaching the young physician how to get enough to warn him not to get too much, & this is the more necessary to be inculcated, as it is so very engaging a study. He should begin with Boerhaave's Elem. Chem.; to which if he add Hoffmans [Hoffmann] Observationes Physico-chem:, he will acquire as much chemistry as a young physician needs set out with. Books alone will give a very imperfect if any conception of the matter. It is requisite, if he would thoroughly understand them, that he should attend some course of lectures at a chemists elaboratory, and then by the means of Vigenius's temporary furnace or Boerhaave's portable ones, perform most of the common operations himself, for otherwise he will never remember them.

## CHAP. 4

## OF THE MATERIA MEDICA

By the materia medica we mean all those animal vegetable or fossil substances which are made use of to cure, prevent or palliate diseases. Books upon this subject generally contain the several ancient & modern names, by which each simple is known among physicians, it's history, the adulteration to which it is liable, it's dose, the manner of using it, and the cautions which it requires. Some treatises take only notice of a part of these particulars & scarse any is exact & to be depended upon for all of them. It is very easy to be seen, that some of these have a near relation, others a more remote one from the grand point to which all our studies are directed. The history of simples is rather ornamental than useful to the physician; however, as it is expected from us, that we should not be unacquainted with it; as it is no unentertaining enquiry, & lastly as it is not without its use, I think it would be culpable to neglect it. The knowledge of the various adulterations to which simples are liable, & which of them are most exposed to fraud, with the ways of discovering them, must sometimes be of service to all practitioners; tho it is of more common use to the druggist & apothecary, to whose skill & integrity the physician generally trusts, & unless on some particular occasions, does not trouble himself with the inspection of the drugs. But then the virtues of drugs, their proper doses, the method and cautions to be observed in using them, are the chief business of the physician without which his enquiry into the causes and symptoms of diseases will be an empty useless speculation. Here therefore we can never take too much pains, but for every superstitious & false virtue we reject, & for every true one that we find out, we shall become the better physicians, less likely to tease our patients with useless medicines, and to fail in endeavouring to releive them with those that are really efficacious. If a man would be exact in the history of the materia medica, he should go to the fountain head, namely to the original authors that travelled into the country, whose drugs they describe, from whom the succeeding writers on these subjects have all borrowed. These we shall find mentioned by Coringius [Conringius] in his Introductio: But if his leisure or inclination will not serve for this trouble, he may get it sufficiently at second hand from Dale's Pharmacologia or rather from Geoffroy de mat. med. Dale is not very full in giving the history; & as to their virtues, he, as most other writers, seems to transcribe from Schroder, who transcribed from the ancients with very little certainty, so that we are at a loss to know, whether these virtues were at first justly ascribed, or that the name signifies at present the same that it did among the ancients. Of the dose, and manner of using it Dale says nothing. He is beside too prolix, taking in all that are known, or however many more than are used in medicine. His method also of disposing of his herbs, which is that of Mr. Ray, is by no means well calculated for teaching their medicinal powers. Geoffroy is much more full in the historical part than Dale, or indeed than any other author, & much more exact & more to be depended on. His disposition of the vegetable part under roots, seeds &c is much preferable to the botanical one used by Dale & he further gives the dose, the manner of using it, & the necessary precautions, nor does he heap virtues upon simples in that injudicious manner in which many or indeed all other writers are so culpable; altho' it must be owned he is rather too liberal of them. This work of Geoffroy, which is in 3 vol. 8vo. is not yet compleat. We want near half the home vegetables & all the animal substances, which are promised to be added to it, and published very shortly. It is absolutely necessary to make a collection of the materia medica, for without seeing the drug itself, it will be often difficult to conceive & almost impossible to remember what is said about it.

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*This paragraph was crossed out in original manuscript, but is left in here because of its inherent interest. L. C.

## Chap. 5

## Of Pharmacy and Prescribing

Pharmacy is the art of preparing & compounding medicines, so as to exalt their virtues, obviate their ill qualities, & render them less nauseous to the patient. The business of this is committed to the apothecary; but as the how it shall be done belongs wholly to the physician (for the officinal as well as the extemperaneous forms come from him) so it is necessary that he should be acquainted with it. Most treatises on the mater. med. mention something of the preparing and compounding part; but to what is met with in these authors Quincey's lectures on pharmacy are to be added. The same authors dispensary must also be had, which gives the virtues of simples as well as the pharmacy. The young physician must also be well versed in the several pharmacopoeias that are either published by the authority of the college of physicians, or are compiled from the prescriptions of men celebrated for the elegance and efficacy of their forms of medicine. These are pharmacopoeia Lond. Edinb. Schroderi, Bate, Fuller & Boerhaave's Mater. med. Together with these the apothecary's shops should be much frequented, as no contemptible schools of modern pharmacy. By these means the materials of prescribing will be gained. As to the form, that is to be learned two ways; first from books on the subject, of which there are a great number, but Geulius's methodus prescribendi alone will be sufficient; the other way is by diligently perusing the apothecary's files, transcribing them on loose pieces of paper, & frequently exercising ourselves in writing of bills. After some little practice in this way, when a man is capable of judging what forms are neat & uncommon, it will be adviseable to write over all such in a book to be consulted, till he has made himself perfect master of them, & has them ready on any occasion. This method will particularly acquaint one with the customs of the country, which no foreign book can teach, & with many other little circumstances, which unobserved make a bill artless & inelegant, not to be learned from any kind of books.

## CHAP. 6

## OF ANATOMY

A doubt is frequently made whether a young physician should begin the study of anatomy with the reading of books or with attending a dissection. But it matters not much which he begins with; for he will find in both great inconveniences & advantages. If he begin with books, he will often be furnished with descriptions, that are at best very imperfect, & which, tho' assisted with figures, sometimes give no idea of the thing, and sometimes a wrong one. If he begin with a course of anatomy, the former inconveniences will indeed be avoided, but then new ones will arise: for he must be at a loss often from being unacquainted with the terms of art, & with many disputes and opinions, that may be often alluded to. Neither will he attend so closely as if his curiosity & attention had been excited by reading; nay the very circumstance of having been puzzled about any point will greatly contribute towards giving one clear and lasting notions of it. Let him therefore begin with which soever of these is most convenient, & content himself that the difficulties which he meets will soon vanish, or that the faint impressions will all grow clearer, as he farther advances in his study.

Anatomy properly signifies the art of dividing the several parts of the body from one another, so as to shew their size, figure, situation, connection & make. There are very few lectures or books, which confine themselves within these proper bounds of anatomy. They generally throw in something of philology & tell us who were the inventors, what disputes have arisen from men's different conceptions & explications, & almost all take in physiology or the Oeconomia Rationalis, that is, the management & artifice of nature in contriving the textures, situations &c, for such particular uses to the animal.

If the study of anatomy be begun with books, I should think to chuse such as treat of anatomy in the large sense, comprehending something of philology & physiology; for a dry description of the parts only is too tedious, at least for a beginner if not for anyone, to read over. As it is proper to begin with a general system of anatomy, Winslow would be greatly preferable to any that have appeared (being by an uncommon fate equally exact in all the parts, as any of those treatises that have been employed about some particular one) were it not for the reasons above mentioned, that he is wholly descriptive, without any philology or physiology; & therefore I think it too tedious for any one to attempt to read him, tho' very useful to be consulted, after a man is an adept in anatomy, in order to refresh his knowledge, or make him exact in any one part. But for our present purpose Drake's Anatomy seems a much fitter book to begin with, as it rather gives the outlines of anatomy, which are what a beginner wants, without descending to such niceties as would perplex without instructing him, and as it carries him on with some pleasure by intermixing the history of the art, & the use of the parts. Verheyen is a system of anatomy, which will serve instead of Drake. No one must expect to be a compleat anatomist by reading these books, which are compiled from other authors, sometimes none of the best & not without mistakes & misrepresentations. They will owe him nothing, if they either teach him, or put him upon learning from his lexicon many of the terms, something of the opinions & sects, & a general superficial knowledge of the human structure. The little peice published by Keil is also a proper book to be read over by a beginner. It seems upon many accounts useful to him to get a set of plates at the very entrance upon this study; first, that he may be prevented from forming false notions & assisted in acquiring just ones; secondly, by beginning to turn them over early, by referring to them on all occasions, & often comparing them, whilst he is dissecting with the parts themselves, he may become such a perfect master of them, & so good a judge, how far they fall short as copies, and so strongly connect them with the life, that he will at last, by only throwing his eye over the figure, have as it were the parts themselves exhibited in one view. Eustachius's tables are greatly recommended by some as the greatest copies after life. But as they are not well explained, Bidloo's tables published by Cooper with additions, & entitled Cooper's anatomy of the human body, will be preferable. As few endeavor to master this study without dissecting with their own hands, Lyster's Cultor anatomicus will serve to instruct how to do this more artfully. A compendium of anatomy is commonly used to dissect by which suggests to us, what is to be observed. The anatomist must provide himself with two, viz. the compendium anatomicae by the celebrated Dr. Nicholas, & Heisters compendium. If he would proceed to get a thorough knowledge of anatomy, he must now enquire after the principal original authors, who write upon some one part only, & what they themselves have observed from their own dissections, & are to be depended upon for their worth and exactness; these being the pure springs, from whence those muddy rivers, the systems, are derived, where they retain but little of their original goodness & purity. Such are the following writers, Willis de ventriculo; (de medicamentorum operationibus, part. 1st, Sect. 1st, Chap. 2d) Payerus de glandulis intestinalibus; Brunner's experimenta circa Pancreas; Glisson de hepate; Malpighi de liene, item de renibus; De Graaf, de organis generationis; Casp. Bartholin, de diaphragmatis structurâ novâ; Willis de respirationis organis et usu; (in his book de med. op. P. II, Sect. I. Chap. I.) Malpighi, epistolae duae de pulmonibus; Lower de corde; Brigg's Ophthalmographia; Julius Casserius de vocis auditusque organis; Valsalva, de aure humanâ; Willis Cerebri anatome; (It will be proper only to read what he says of the nerves & brain; & no one can be too exact in his knowledge of the course of the intercostal nerve & of the eighth pair of nerve.) Ridley's anatomy of the brain; Vieussens' neurographia; Whartons adenographia, Nucks adenographia curiosa; Cowper's myotomia reformata; Douglass on the muscles; Havers on the bone; Monro on the bones; Ruyshii, opera; Morgagni adversaria anatomica; Sanctorini, observationes. Many of the above mentioned tracts are collected together in two vol. fol. called Bibliotheca anatomica where there are many other peices well worth being consulted. Boneti sepulcretum anatomicum is a collection of all the dissections of morbid bodies that are any where mentioned. Tyson's anatomy of the Ouran-outang; Malpighi de cornuum vegitatione; & Blassii anatomia animalium deserve a place in this catalogue of anatomical books.

My reader must give me leave under this head once more to remind him of the chief end of all his studies; for anatomy, tho' of great importance is not the only thing necessary. But even this however useful a study may be pursued to the neglect of others without which a man will never be qualified for his profession. But together with my cautions not to get too much, I must desire him not to be too sparing of his pains, but to be sure of getting enough, & to offend rather on the extreme of knowledge than of ignorance. For this purpose he will do well to remember, he will have few opportunities of improving in anatomy after he has begun the practice, but must live upon the stock of his early studies. There are some who think it is expected from us, that we should do for those that come after us what our predecessors have done for us, and that we should deliver the science to them with new discoveries of our own; but I could rather wish that this business was confined to men sufficiently encouraged to make it the sole employment of their lives; for anatomy of late is so much increased, that those who intend for the practice of physic will ordinarily spend as much time as they can conveniently spare for it, in learning what has been already found out by others, without busying themselves in new discoveries.

## CHAP. 7

### OF INSTITUTIONS

Institutions, I beleive, were first talked of in the civil law and signify there a compendium or summary treatise, in which the elements of this science are contained for the use of learners. In like manner, Institutions in medicine signify that knowledge, which all beginners must make themselves masters of in order to become physicians. Under this head of institutions are reckoned physiology, or the oeconomy & contrivance of nature in adapting the parts to their several uses. This has been already treated of under anatomy, there being few books, as I said, which are purely anatomical without annexing the use of the parts. To these we may add here such as are purely physiological, as Keil's Medicamina medico-physica, in which some curious questions are discussed in a plausible ingenious manner; Sanctorii aphorismi de medicinâ staticâ, in which quantity of perspirable matter, and the importance of this excretion are determined, but it is perhaps pretended to be of more moment (as most discoveries are at first) than it will be found to be in fact. Bellini de pulsibus et urinâ has all & more than all the useful doctrine about them. Borellus de motu animalium is another book of great curiosity, but of no great service towards the curing of diseases. It determines what force the several muscles exert in their actions, and discovers as much of the wisdom of the Architect, as any one does that makes any inquiry into his works. The celebrated discovery of the circulation of the blood would make any one desirous to read the discoverer's treatise to prove it, Harvey de motu cordis, tho' all are at present sufficiently persuaded of the truth of it. Besides Dr. Harvey was so diligent & sagacious an anatomist, that all his works abound with new & useful observations. The same author's book de generatione animalium is an admirable work made up of his own indefatigable researches into nature by innumerable dissections. Dr. Friend [Freind] in the first part of the Emenologia, has explained the oeconomy of nature in this particular in a manner that has satisfied many, tho' there are some that disagree with him. Of these Dr. Sympson* has published a pamphlet, called the system of the womb, which has been thought more successful in it's objections to Friends [Freind] system than in establishing a new one which he proposes of his own. Pitcairns works likewise contain many physiological tracts;—and so much for physiology which is the first part of what is called the institutions. The second is what is called*

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*I have been unable to find any trace of Dr. Sympson or of the pamphlet referred to. L. C.

The art of preserving such a system as the body appears in a due order for the exercise of all it's functions for the longest time. The next part, pathologica universalis or general theory of diseases is in like manner deduced from physiology, and teaches that the body may be disordered, the different manners in which this may happen, & the various courses of these disorders with their attendants & consequences. A fourth part deliver the doctrine of signs, by which a judgement might be formed of the healthy or diseased state of the animal. Lastly, comes the Therapeutica, which contains the means & method of restoring a distempered body to health. The treatises which are called Institutions consist of all these matters. Of the many which are thus entitled, I would recommend only two,—the three first tomes of Hoffman's [Hoffmann] systema medicinae rationalis, & Boerhaave's Institutions with his lectures upon them: for these are judiciously compiled, and parti- [particularly] the last of them from all the preceding authors on this subject. The physiology of Boerhaave's institutions has lately been published separate under the name of oeconomia animalis with copies of the plates to which he refers, & these are the best, that are scattered among all the anatomical writers, so that it is a most useful book for learning not only the use, but structure of those parts with which a physician is principally concerned. This then is the form of instituting a young physician, which has been delivered down to us from the eminent schools erected at the restoration of learning, & is to this day used in all the European schools of physic. But notwithstanding the authority of ancient custom, we may take the liberty to say, that there are many inconveniences attending this form of delivering the elements of physic. For after all our boasted advancements in anatomy, we still know so little of the matter, that tho' our knowledge in it joined to fact will be an assistance, yet it is far from being compleat & enough upon which to build the pathology, without consulting particular fact & experiment. Hence it comes to pass that those who have deduced from the make of the parts general theories of health & sickness, have been constantly betrayed by the very form of the work to give us a medley of fact & fiction. For to compleat their systems & make them coherent, they are forced to extenuate some facts, to magnify others, & so do violence to nature in most in order to adapt them to the places which they must fill; add to all those that these institutions of physic were so much infected with the false learning of the ancient schools, when distinction & technical terms passed for reason & knowledge, that the latest authors have not been able to keep perfectly clear of it. What is here said is not intended to dissuade the young student from reading institutions, for they will give him the opinions in vogue & the received explications of phaenomena; he learns from them beside some necessary terms of art & several other matters of substantial use. But it is necessary he should be upon his guard & not have too implicit a faith in those theories, that he may not be disappointed when he attends upon nature, and finds things go on not altogether so smoothly as they did in the system.

## CHAP. 8

## OF THE HISTORY OF DISEASES AND THEIR CURE

The practical writers are such as give a history* from nature of all things antecedent to a disease, that may have any respect to it; of the circumstances that are found to accompany it; of the method used for it's cure & the event. This is called pathologia particularis, as it consists of all the separate history of every disease collected a posteriori, by which it is distinguished from pathologia universalis, or the general theory deduced a priori. We are therefore come at last to the great business of the physician, to which all that has hitherto been said is only preparatory. In this pursuit he is to set himself no bounds, but must be perpetually adding either to his own observations by those of others, or enlarging what others have done by what he himself observes, nor must his study in this part end except with life. I shall point out some useful authors to him, by whom he may be initiated, & after reading these he will be himself able to find out others & form a proper judgment of them. I shall begin as I did in anatomy by mentioning such fas [as] have written a system of all diseases, & proceed to those who have considered only a few or some particular ones. The same too may be said of the system writers as almost everywhere else; that as they have very little of their own, but for the most part compile only from others, so they fail in being so exact & faithful representations of nature being often copies of a third or fourth remove from the originals. Boerhaave's aporisms are perhaps as faultless a work of this kind as any that can be mentioned; but then the young student will not be able to understand it, without the authors comment, many copies of which are handed about in manuscript, most of them very faulty, but the faultiest of all has got into print, under the name of Boerhaave's Praxis: we are daily in expectation of a more correct edition from some of his pupils in Holland. The latter part of Hoffmans [Hoffmann] systema medicinae rationalis, which treats of the pathologia particularis is also reckoned a principal performance on this head. Allen's Synopsis is another history of all diseases, consisting of quotations of author's in their own words, tho' not always the best, nor ranged in the best method. This book is better more occasionally to be consulted than read over. Lommii opusculum aureum is a little book, but in great esteem; it relates the remarkable appearances of most diseases, without going back to their causes, or mentioning a word of their cure. Shaw's practice of physic seems intended to shew the practice of the English physicians in their method of applying to diseases. Junkeri conspectus medicinae theoretico-practicae is the best of the system writers. I shall mention, as an author whose collections are very full, & his manner of disposing them seems well contrived for the refreshing the consultor's own knowledge of any disease, & for suggesting to him what others know about the matter. The first of those writers who have treated only of a few distempers is the admired Sydenham, whose merit is, that he is an original one, giving only what he himself observed in diseases he is judged to come nearer to the true idea of a practical writer than most other authors, as he has mixed but little of hypothesis & speculation with what he says, being generally contented with relating an exact history of the rise & progress of the disease, & of that method of treating the patient which was found most effectual in conducting him easily to a speedy recovery. Moreton's Paretologia is in a great measure taken from nature, & deserves to be read for his descriptions of diseases, but is much less valued than it otherwise would be, by being made to hang upon an hypothesis about the oppression & expansion of the spirits, which has so far influenced his practice, that it is dangerous to follow his method of cure. The same may be said of his physiologia. Ramazini [Ramazzini] de morbis artificum is an useful & not unentertaining history of diseases peculiar to that race of mankind, with some advice towards their anticipation & cure. Bellinus de morbis capitis et pectoris has judiciously & faithfully transcribed from others the antecedent, concomitant & succeeding phoenomena of these diseases: in his manner of doing this he is much more commended by some than in his solution of all those phoenomena, as being more plausible & ingenious than solid & satisfactory. Joh. Jac. Wepferus is an author of good reputation & his treatise de apoplexia is worthy of his character. Some useful practical knowledge may be got from Floyers treatise on the asthma. Astruc de lue venerea is one of the most compleat histories of any disease that has ever been published: it includes the philological as well as the pathological & therepeutic parts, the whole of which is executed in so masterly a manner, whether we consider the author's learning, language, judgement, or experience as to give this book a singular degree of perfection. There is a treatise on the same argument by Turner entitled syphilis which deserves to be read by a practitioner; as does the same author's book on the diseases of the skin. Highmore de passione hystericâ et hypocondriacâ gives some light to these distempers. The way of treating the various forms in which the gout appears may be learned from Musgrave, de Arthritide. The doctrine of worms in the human body may be had from Clericus, de lumbrico lato, which is a good collection of most of the writings on this subject, which are worth being read with his own experiments & observations. Mauriceau in his traite de maladies de femmes grosse & Deventer will instruct one sufficiently on this head. The diseases of children are practically considered by Harris de morbis infantum in a small tract, yet the whole of what he says might be contained in a much less compass. Glisson de Rachitide is a full history of that distemper, but the tedious scholastic manner in which it is composed, may justly be censured, which indeed has more or less but too much infected this class of writers, and kept us considerably back from that height of knowledge in diseases, to which we may by this time have been more advanced, if men had been more solicitious to say what nature had furnished them with, than to fill up all the heads which the schools direct them to use. Among practical books, there are many under the title of consilia, which consist of cases proposed to physicians, with their advice on them. I shall say nothing of their use, because I would not have a beginner to study them, & afterwards, he will chuse to judge for himself how far they are worth being studied.

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*Space left in original manuscript. L. C.

*Dr. Heberden note: "from observations." L. C.

## Chap. 9

## Of Surgery

The province of surgery is totally separated from the physician; some little acquaintance with the modern practice of it is all he needs desire. It may perhaps be of use to the surgeon to look back into the ancient writers (tho' it is probable that the common practice & the modern books preserve all their useful inventions and knowledge) but to physicians, at least to a beginner it can hardly be worth while to enquire after what were written a century or two ago. If he finds himself disposed to do it, Coringius's [Conringius] introduction in his chapter de chirurgiâ will furnish him with the names of these authors & a little of their characters. But in my opinion Heister's chirurgia, Turner's surgery & Sharp's surgery are all the chirurgical books he will want.

## Chap. 10

## Of Observation Writers & Miscellaneous Books

Beside the authors to which the young physician has been hitherto directed, there are many of a miscellaneous nature, who will repay his researches into them with excellent facts & remarks. Such are those books which are published under the title of Observationes medicae, of which there are a great number. They generally consist of short incoherent chapters, each of which contains some remarkable fact, relating to one of the branches of the profession. 'Tis of importance to distinguish them into two kinds; the first original or such as are made by the author himself; the second, such as relate facts, that did not fall within the author's own knowledge, but are compiled from other writers. I have so often taken notice of this distinction before, that I need not enlarge on the superior excellence of the first class, unless the facts are given in the original authors own words: for the slightest alteration, or a bare translation will often give them a quite different turn. No writer will deserve better of a physician than a faithful and judicious author of observations, for these are the source of all our valuable knowledge in the history and cure of diseases; so that upon particular occasions he may have the advantage of a long experience, & illustrate the case proposed with the collected light of many ages. Most of these collections are properer to be consulted than read over; though Tulpius's observations will I think very well bear it, & they are all or nearly all original ones. Schenchius & Forestus are those compilers which seem to be oftener quoted. There are a large catalogue of others referred to in the index of Lindenius renovatus, which is called his Cynosura, under the head of observations. I purposely omit saying any thing further of them since they are not much consulted till a man has begun the practice, & can judge for himself. There are other miscellaneous books, which a physician must be acquainted with; such as Hoffman's [Hoffmann] dissertations, the Scotch medical essays, & the various journals & transactions of learned societies, which last are repositories of much rare & valuable knowledge to a physician, tho' defended from common use by the immoderate price of such books, & oppressed with the heaps of other learning, I think it is much to be wished, that the medical papers were collected out of these volumes, & published separately, digested into their proper heads, that so they might more easily come into the hands of those for whose use they were designed.

### CHAP. II

### OF THE TIME FOR BEGINNING THESE STUDIES & OF COMMON-PLACE BOOKS

Anatomy in the proper sense of the word, that is, unmixed with the use of the parts & the doctrine of diseases cannot be learned too soon. Galen, in the beginning of his second book of anatomical dissertations, mentions it as the common practice of ancient physicians, who of course instructed their sons in their own art, to exercise them from their childhood to dissections, by which means the knowledge of the parts of the body were as deeply fixed in their memories as the elements of speech, & he judged it a disadvantage that the different method of learning the profession forced him to begin anatomy later. The same may be said of botany, the history of the materia medica, & an acquaintance with the sight of it. So that he cannot begin upon these too soon, if he would, as he must learn them as soon as he can. After three years spent in academical learning, it may be proper to begin with introductory books, which with physiology or the theory of diseases, as delivered in the institutions will sufficiently employ one year. The next year may be usefully laid out in chemistry, learning the virtues of the materia medica, & prescribing. The following year must be employed among the practical writers, the authors upon surgery, & attending an hospital. The next thing to be considered by a young physician is an effectual manner of making these things his own, which he meets with in reading or otherwise, & which the happiest memory unassisted would scarce be able to recollect all occasions that would require them. First then let him interleave Dr Nicholas' compendium or Heister's, & let them receive all such observations, as confirm what was doubtful, correct what was mistaken, & supply what was defective. If these matters are of such a nature that he may probably have occasion to look at them again, & without this help would not know where to find them, he will find these books sufficient for all such remarks, unless he makes them more particular & extraordinary by his study, & in that case he will contrive the means of methodizing his knowledge for his own use better than anybody can direct him. For the history & cure of diseases Junker's conspectus medicinae, or Allen's synopsis interleaved may be a commodious receiver of what he would write down on that head. It may be no useless caution to desire a beginner not to be too forward in writing, but rather to let it quite alone, till he is advanced some way in these studies, & is become a better judge of what is rare & useful & worth his notice. A proper way of entering observations on the materia medica, is to make as it were a treatise of your own by writing in a proper book a catalogue of simples & under every simple a brief account of it's adulteration, preparation, dose, manner of use, & virtues: besides, this method will assist the memory in retaining these particulars which is no small difficulty, & a convenient space should be left after all those simples, that are likely to have a great deal said about them, as opium, mercury, the bark, &c, & here may afterwards be set down whatever occurs on those heads that deserves it. The history will be scarce worth meddling with, unless there be some very curious & not commonly known particulars. Geoffroys method of ranging the simples is as good as any to be followed. The labour of doing this will be much less than at first it seems, for the simples in common use are very few, & of the far greater part of those which the pharmacopoeias call medicinal there will be little more to write than their names. A catalogue of all the chemicals in use may be added to the foregoing for the same purposes. To these catalogues an index of their virtues should be made as Diuretica, Ischema, Anthelmintica & under which should be mentioned all those simples to which such virtues have been ascribed. This index, whenever it is wanted to answer any intention in practice will at one view present a man with his whole knowledge of the powers of medicine for this purpose.

Whoever would make a due use of his attendance on hospitals must be at the pains of writing down the history of diseases & the method of cure, that he may have a fair veiw of the case after it is ended, & to fix it deeper in his memory. Lastly a common-place book, with such an Index as Mr. Locke recommends in his methodus[*] will be necessary for the reception of philological knowledge, or of any other kind, which does not belong properly to any of the above mentioned books.

It remains only to say a word of preparing for practice. Several treatises have been written to direct a physician in his address & behaviour toward a patient under the titles of de ingressu ad oegros, de ratione visitandi oegros, which are referred to in the Cynosura of Lindenius, under the article of Oegri visitandi quomodo. Turner has written something on this subject, in a book called a discourse in two letters to a young physician, which it may not be amiss to read over. But the best method of succeeding here, is to endeavor to observe or inform ourselves of the address & manner of those physicians, who have risen to the top of their profession with general applause, & to propose them for examples. Every one's good sense will be ready upon a slight reflexion to teach him how much an injudicious imitation of the humours & particularities of these great men is to be avoided. I submit it to the young practitioner's judgment, whether he will have any occasion for a paper book under the title of Liber observationum medicarum.

## CHAP. 12

## OF THE ANCIENT GREEK & LATIN MEDICAL WRITERS

Hippocrates lived 400 years before the birth of our saviour. Socrates, who was contemporary, mentions (Xen. Mem. Lib. 4. Chap. 2–10.) a multitude of books, which the physician had then written, & we know the names of many authors, who lived between their age & the christian oera: yet it has so happened that of all these writings, if we except some fragments & a few medical poems, none are at present extant but those of Hippocrates, which stand alone amidst this great waste, that time has made all around them. The next to him after this long interval is Celsus, who wrote about the beginning of the 1 century; & not long after him, Scribonius Largus, Soranus, Dioscorides, Rufus, Ephesius, Xenocrates, Aretaeus, Caelius Aurelianus, & Galen. The fourth century has left us Vindiceanus, Theodorus Priscianus, Marcellas Empiricus, Oribasius. From the fifth we have Aetius, & from the seventh Alexander of Tralles & Paulus Aegina. I have purposely omitted Theophrastus the philosopher & Neander the poet; for the first treats largely of plants & has even a few little peices on some diseases; yet he treats them more like a naturalist than a physician, being contented generally with describing the first, & confining himself to the consideration of the internal causes of the latter. Neander indeed in his two poems, one on venemous beasts & the other on antidotes, is much more of a physician than poet, & may be considered as such. These are all that flourished before the Arabians, who began to write books about the seventh century, or a little earlier, & continued to the thirteenth. It will not concern a beginner much to enquire after them: however, he may have an account of their ages & writings from Dr. Friend's [Freind] history of physic, Coringii [Conringius] introductio in universam artem medicinam, & a variety of other authors referred to by Lindenius, under the title of medicorum vitae clarorum descriptae. There were two or three Greeks, who wrote during the age of the Arabian physicians, whom I shall not rank among the ancients; & much less will it be necessary to take any notice of the Latin medical writers, who lived in the 11th, 12th, 13th, or 14th centuries. No one can expect that men of science should descend into those dark ages for improvement, when the historian & antiquary have scarce light enough to find out their way. A sufficient account of these authors may be had from the books to which I referred for the Arabians. In the 15th century good learning revived; the ancients were studied, & the writers from this time I call the moderns, of whom the more eminently useful for beginners have been mentioned in the preceding chapters. To return then to the proper business of this chapter, the consideration of the ancients. Every scholar, by seeing their excellence in all other parts of learning, will come to them sufficiently prejudiced in their favour, which good opinion will be considerably encreased by the high encomiums which they have received, & the great use which has ever been made of their works. Galen calls Hippocrates' writings the Word of God, & Eusebius tells us in his ecclestical history that Galen himself was adored. The Arabians did little more than compile them, & all other writers borrowed from them at second hand thro' the Arabians, till the revival of learning, when the originals themselves were applied to, as the oracles of physic, & many learned men spent their whole lives in studying, explaining, & publishing them. They have been ever since appealed to as such as were of a higher & more enlightened class of writers. And at this day, "a thorough acquaintance with them is recommended by the greatest masters as the surest way to fit a man for the practice of this art." (Friend's [Freind] Hist. of Phys. Vol. 1st, p. 302.) Paracelsus & his followers have been almost the only set of men, who have been hardy enough to oppose their reputation; but the absurdities of these wild enthusiasts have given such abundant matter of triumph & reprisal to the patrons on the other side, that their opposition has rather established than destroyed the credit of the ancients.

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[*] Reference not completed by Dr. Heberden. L. C.

Let us first enquire after the old Greek physicians, who may be ranked into three classes: first, Original writers, who are come down tolerably entire to us; secondly, collectors from others: & lastly, such of whom we have nothing but fragments & inconsiderable remains. To this last class belongs Soranus, Rufus, Ephesius, Xenocrates, & Vindiceanus, to whom may be added Diocles, Carystius, Capive, Jatrosophila, & some few others, that are mentioned by Fabricius in his 12th vol. of his bibliotheca Graeca. Of these I need say no more than that it will take up very little time to read them, & there will be no great harm for a beginner to neglect them. Secondly, as there are original authors sufficient to supply any one's studies, during his noviate in physic, I think the farrago of the collectors as well as the fragments may be left to be run over afterwards, especially as these collections are chiefly made from Hippocrates & Galen, whose work we have. Oribasius, Aetius, & Paulus Aegineta, I reckon among the collectors, not that they are entirely such as not to have several things of their own, or however from authors, whose works are lost, for which they may be worth our perusing afterwards: in particular the 6th book of Paulus Aegineta is much celebrated for its treatise on surgery, being the foundation, as Dr Friend [Freind] says, of all the modern treatises to this day upon surgery: this book then may be worth a young beginner's looking into. There remain for original authors Hippocrates, Dioscorides, Aretaeus, Galen, & Alexander. As Hippocrates is the most ancient of these, he shall be considered more at large, & under him shall be shown what advantages may be fairly expected in general from these old physicians. If we beleive the celebrated Dr Friend [Freind] they were not only the greatest masters in their own art, but deservedly reckoned among the ablest writers: in particular he calls Hippocrates the great pattern of perfection for all succeeding physicians, just as Homer & Virgil among the poets, or Demosthenes & Cicero among the orators. (Dedic,) Nor is Boerhaave less liberal of the panegyric of Hippocrates. (Prat. de commend* ) It will be necessary to examine into the particulars of their merit in order to form a just estimate of them. There is no chemistry to be learnt from them, for it was unheard of in physic till some hundred years after the latest of them. They had made but very little progress in botany, & had not found out such a method of characterizing plants, as to deliver them down with any certainty to posterity; consequently we are very little the wiser for what they say of unknown plants. This affects a considerable part of their materia medica, which is chiefly taken from vegetables; tho' even as to those parts supplied by animals or minerals, we are in regard to many things that are removed from common use in the same confusion & obscurity. Their pharmacy or art of preparing & compounding simples; partly from the uncertainty of the simples they teach us to prepare, & partly from the improvement which longer experience & chemistry have supplied us with, or the great number of new drugs made necessary, their pharmacy, I say, for these reasons must be very uninstructive and consequently tedious; which they do not seem to be aware of, for these books are clogged with a great number of these obsolete, unintelligible receits. There is great reason to believe that they very rarely dissected a human body, & accordingly there was scarce any thing known of it, till the great Vesalius taught us to leave disputing about the anatomy of the ancients & to study nature. The most reasonable therefore of their descriptions are generally taken from other animals, but by far the greatest part from conjecture, & of course nothing can be more false & unnatural than their systems of anatomy. Their natural philosophy was very little better, for every one knows in what state it was only an age or two ago, when men first began to leave studying Aristotle to study nature. Now upon anatomy & natural philosophy is founded physiology, for the use of the parts. What therefore can we expect from the ancients on this head, but a heap of wild notions, such as are the usual product of an imagination let loose upon those subjects without any help from observation & matter of fact. All these defects in the above mentioned branches of this study, which can hardly be disputed by any one, must therefore be abundantly compensated by their merit in the history of diseases, which alone remains to support their character.

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*Reference not completed by Dr. Heberden. L. C.

Hippocrates in particular is represented as excelling all others upon this head. He was indebted to nature for a sound understanding, & applied himself to the schools of the philosophers for all the learning of the age. Fortune conspired with his own industry to furnish him with several uncommon opportunities of improving himself in his particular profession. He was descended from a long race of physicians, whose receits & experience he inherited, which he enlarged with the votive tablets from the temple of Aesculapius in his native island of Cos, by travelling into many countries in quest of further experience, & by observations sent him by his disciples out of various parts of Greece. Thus qualified for making observations, he was happily for us remarkably faithful & ingenuous in reporting them. If this great man was not perfect, it was owing to the imperfection of human nature, & some disadvantages that necessarily attend[ed] the times in which he lived. It will be proper to point out some of these, lest from the high encomiums, which he has acquired, we should be inclined to ascribe more unto him than he was capable of deserving. Knowledge in nature is justly called the daughter of Time & Experience, & indeed of much longer time & experience than we are apt to imagine after the discovery has been made. It is a great while before men are capable of making any use of what passes before them unless they are put upon the observing of it. When they first enter upon a new field of knowledge, they are struck with many insignificant appearances & pass over others of the greatest importance: they are too impatient too wait for the slow production of nature for the formation of their system, & so help it forward by the warmth of their fancy: they are too hasty in coming to general conclusions & aphorisms from too small a number of facts; which sort of knowledge, like the ill-gotten possessions of those who make haste to be rich, seldom thrives, moulders, & comes to nothing with their posterity. All which is exemplified in Hippocrates & all the other principal writers of antiquity. These then are the disadvantages Hippocrates laboured under from the condition of physic & natural philosophy, & were the faults of the age. He would be more than human if he did not add to them by his own. He was obliged to take up with several absurd notions of the animal oeconomy, as he could have little or no leisure to examine or rectify them. But as Cicero says of the Epicurians, that they were too honest to act up to their principles, so Hippocrates, I beleive, was commonly too wise to act up to his theory. Yet we can hardly imagine, that he was entirely free from it's influence, & never suffered, as Boerhaave asserts any hypothesis or false philosophy to mislead him. It is impossible to read over his works without seeing many things that must be placed to this account. His great admirer & copier Celsus allows, that the virtues he has attributed to an odd number, & particularly to the number seven were filched from Pythagoras's mystic philosophy: & we need go no farther than what he says on the signs of barrenness, & of male, & female conception for a full proof that he advances many things, which he could never have from nature. What I have here said may perhaps be censured by some warm admirers of Hippocrates, who setting out with a notion of his infallibility & omniscience endeavor to get his authority for every thing they say, & frequently find in him what was never there. They pay him a very awkward compliment, for he was really the strangest writer in the world, if he knew so many things they make him know, & yet gave such obscure hints, that few are able to guess he had any such meaning. Hippocrates himself would have condemned this if he was alive, as he ridicules in one part of his works that prodigy loving-humour of mankind, that had attributed to several physicians pretended insights into diseases, that were wholey beyond all reasonable beleif; as that a man in health & in business should be taken ill & die in 24 hours, with other things of the like nature, which have been repeated upon Hippocrates himself, & continued down to several succeeding physicians, & I doubt not are often yet to be said of others that shall be famous hereafter. To sum up what has been said: there is no chemistry in Hippocrates, & but very little use to be made of his materia medica & pharmacy; his anatomy & natural philosophy are most chimerical, & have given birth to a physiology, which has all the genuine marks which become the offspring of two such parents. In his history of diseases there is no one but meets with such defects & superfluities as to make it impossible by the help of only what he says to conduct it from beginning to end. We must likewise always remember that some of his observations are built upon his theory & philosophy, upon the rude accounts of his predecessor, the slight ones of his disciples, or upon the records left in the temple by those dreamers.* Nay even in some of those where nature was consulted by himself his conclusions were too hastily formed & have been contradicted by longer experience. We can never therefore safely practise upon any of his aphorisms that have not been confirmed & made probable by later experience. But then there are many detached maxims that are extremely just, such as become a man of sense & careful observer of nature. Besides, from reading him & the other ancients we may learn the progress & gradual improvement of the art, with the true meaning & etimology of it's terms, which, tho' not very useful to know it would be shameful to be ignorant of: & we may reap a more solid benefit by being acquainted with the foundations of several aphorisms which prevail to this day, of whose weight & authority we cannot otherwise form any judgment. There are likewise many sensible instructions in Hippocrates relating to the behaviour & conduct of a physician & useful reflections on the nature of his art & the best manner of attaining it. Le Clerc's history must be consulted for several particulars which are useful to be known, relating to his life, character, & distinction of his genuine works from those that are spurious. I refer my reader to the same work, as to that of Dr Friend, [Freind] for all the other ancients that I mention. Fasius's edition (the last is that of Geneva, Fol. 1654) is by Dr Friend [Freind] (Praef. Epid, Hipp.) reckoned better than the pompous one of Charterius, & with it Fasii oeconomia Hippocrates will be necessary as a lexicon. The celebrated commentators on him will be met with in Coringii' [Conringius] Introd. in univer. medicinam. Prosper Alpinus ought here to be mentioned for his treatise de praesagiendâ vitâ et morte, in which he has with great care collected & methodized all the scattered observations of Hippocrates referring to the dangerous & salutary appearances in diseases.

I am at a loss whether I should recommend Dioscorides to be read over. The reader must see the cause of my doubting when he knows that it is a treatise of all the simples known to the ancients, with their virtues: for it has been said above that we are for the most part uncertain about the names of simples. Unless therefore a person makes botany his particular study or the materia medica he will find the reading of Dioscorides to go off very heavily. However there can be no doubt but that he may be often very usefully consulted for the qualities ascribed to those drugs, whose ancient names we are sure of; & farther, to see upon occasion whether what is said by moderns upon several parts of the materia medica be not transcribed from him, & applied by guess to what they supposed he meant, & to value it accordingly as a peice of guess work. The best edition of it is of Frankfurt, Fol. 1598. It would be in vain to recommend such a voluminous an author as Galen to a beginner, who must be satisfied for some time with what Le Clerc says of him; or by just taking a taste of this author, by reading any of his peices, that seem to promise best. Aretaeus & Alexander are both practical writers, such as speak chiefly of the appearances of distempers & their cure or relief from their own experience. The character that is given of them by Le Clerc & Dr Friend, [Freind] with what has been already said under Hippocrates that is applicable to the ancients in general, will sufficiently inform us what we are to expect from them. The last edition of Aretaeus is that published by Boerhaave at Leyden, 1731. Fol. A new edition of Alexander is much wanted; the fairest copy is that of R. Stephens at Paris 1548. Fol. The only Greek & Latin edition was published at Basil, 1566, 8vo. Neither have the epistola de lumbricis, which is given by Fabricius in the 12th vol. of his bibliotheca Graeca. Dr Friend [Freind] is of opinion that the 12th book of Alexander is misplaced & ought to be put first; for it begins with a preface which seems to be an introduction to the whole work, as must appear to every one. But whatever is to become of the preface, the book itself was certainly placed by the author, at the least, after the 7th book; for in that he refers to the book on fevers as yet to come & therefore probably in the place where it now stands.

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*Note by Heberden: Macrobius says of Hippocrates that he was "tam fallere quam falli nescius." L. C.

In the next place I am to speak of the ancient Latin writers of physic. These are Celsus, Scribonius Largus, Caelius Aurelianus, Marcellus Empericus, Theodorus Priscianus & Sentes [Sextus] Empericus or Placitus. Of these Scribonius Largus is only a collection of prescriptions, the style of which is so remarkably bad, that many have believed the author lived later than Tiberius, & others have thought it only a translation from some Greek author. There is nothing in it that can invite a beginner to read it: much less needs he enquire after Marcellus Empericus, which is almost entirely stolen from Scribonius Largus. Sextus Placitus or Empericus de medicinâ ex animalibus is a dry account of the medical uses ascribed to some animals. This little peice is to be seen in Fabricii biblitheca Graeca, Vol. 13. It's shortness woud sooner tempt one to read it than either it's stile or matter. There has been no late edition of Theodorus Pricianus so that it would be more trouble to get at it (for it is not common in our libraries) than it deserves. Let the beginner be contented with what Le Clerc & Dr. Friend [Freind] say of him. We have reduced the small number of the ancient Latin physicians to two, Celsus & Caelius Aurelius. The first of these is the only classical writer in physic who for the purity of language & elegance of sense is worthy the age that it commonly allotted him,—the latter end of the reign of Augustus or the beginning of that of Tiberius. This author cannot be read over too often, till we are become of the terms and expressions peculiar to physic which occur in him, as to have them always ready upon every occasion of writing upon a medical subject in the Latin tongue. Caelius Aurelius is notorius for the badness of his stile as Celsus is for his purity; but for this & his tedious cavils at physicians, he makes us ample amends by his full & accurate description of diseases. The last edition of Celsus was printed at Leyden 1730 in two tomes 12 mo. The best edition of Caelius Aurelius was printed at Amsterdam, 1709, 4to. The proper time for reading these ancients, will be after the young student has begun upon the history of diseases, & they should be read in the order of their ages.

FINIS

## A CATALOGUE OF THE BOOK RECOMMENDED

### *Introductory Books*

Histoire de la medicine, par Le Clerc.
Friend's [Freind] History of Physic.
Castelli lexicon medicum.
Quincy's Lexicon.
Coringii' [Conringius] introductio in universam artem medicina. Ed. ult.
Lindenius renovatus per Inerchlinum. 1686.
Mangeti Bibliotheca scriptorum medicorum. 2 vol. Fol. 1731.

### *Botany*

Raii methodus plantarum emend. et auct. London 1703.
Synopsis methodica Stirpium Britannicanrum. Ed. 3d.

### *Chemistry*

Boerhaave elementa chemiae.
Hoffman observationes physico-chemicae [Hoffmann, F. Observationum physico-chymicarum selectiorum libri. iii, 1722].

### *Materia Medica*

Dale's pharmacologia.
Geoffroy de materiâ medicâ. 3 Tom. 8 vo. Paris 1741.

### *Pharmacy*

Quincy's pharmaceutical lectures.
Quincy's Dispensatory.
——— Londinensis.
——— Edinburgensis.
——— Schroderi.
——— Bate.
——— Fulleri.
Boerhaaves materia medica.
Gauvii methodus proescribendi.

### *Anatomy*

Winslow's
Drake's } Anatomy
Verheyen's
Keill's } Anatomy
Cowper's
Lyseri Cultor anatomicus.
Nicholas's } Compendium
Heister's
Willis de ventriculo.
Payerus de glandulis intestinalibus.
Brunneri experimenta circa pancreas.
Glisson de hepate.
Malpighi de liene.
——— Renibus.
De Graaf de organis generationis.
Casp. Bartholin de diaphragmatis structurâ novâ.
Willis de respirationis organis et usu.
Malpighi epistolae duae de pulmonibus.
Lower de corde.
Julius Casserus de vocis auditûsque organis.
Brigg's opthalmographia.
Valsalva de aure humanâ.
Willis cerebri anatomia.
Ridley's anatomy of the brain.
Vicussen's [Vieussen] neurographia.
Wharton's adenographia.
Nuck's adenographia curiosa.
Cowper's myotomia reformata.
Douglass on the muscles.
Haver's on the bones.
Monroe ———
Ruyschii opera.
Morgagni adversaria anatomica.
Sanctorii observationes anatomicae.
Bibliotheca anatomiae.
Boneti sepulchretum anatomicum.
Tyson's anatomy of the Ouran-outang.
Malpighi de cornuum vegetatione.
Blassii anatomia animalium.

### *Institutions*

Keills tentamina medico-physica.
Sanctorii, aphorismi de medicinâ staticâ.
Bellini de pulsibus et urinâ.
Boreleus [Borelli] de motu anamilium [animalium].
Harvey de motu cordis.
Harvey generatione animalium.
Friend's [Freind] Emmenologia.
Simpsons system of the womb.
Pitcairn's works.
Hoffmani systema medicinae rationalis, 3 first tomes.
Boerhaave's institutions, or oeconomia animalis.

### *Practical Writers*

Boerhaave Aphorismi.
Hoffmanni systema medicinae rationalis. Latter part.
Allen's synopsis.
Lommii opusculum aureum.
Shaw's practice of physic.
Junker's conspectus medicinae theoretico-practicae.
Sydenhami opera.
Moretoni paretologia.
——— physiologia.
Ramanzini [Ramazzini] de morbis artificum.
Bellini de morbis capitis et pectoris.
Joh. Jac. Wepferus de apoplexia.
Floyer on the asthma.
Astruc de lue intereâ.
Turners syphilis.
——— on diseases of the skin.
Highmore de passione hystericâ et hypocondriacâ.
Musgrave de Arthritide.
Clericus de lumbrico lato.
Maurceau traite de maladies de femmes grosses.
Deventer's ars obstretricandi.
Harris de morbis infantum.
Glisson de Rachitide.

### *Surgery*

Heisteri Chirurgia.
Turner's } Surgery
Sharp's

### *Miscellaneous Books*

Tulpii observationes.
Schenchii, observationes.
Foresti observationes.
Hoffmanni dissertationes.
Scotch medical essays.
Philosophical transactions.
Ephemerides memoirs.

### *Common-place Books*

Dr. Nicholas's or Heister's Compendium interleaved.
Junker's conspectus medicinae or Allen's Synopsis interleaved.

### *The Ancient Greek & Latin Writers*

Hippocrates Fasii, 1687. Fol. with Fasii oeconomia Hippocratis, and Prosper Alpinus de praesagiendâ vitâ et morte.
Dioscorides. Frankfort, Fol. 1598.
Aretaeus by Boerhaave. Leyden, Fol. 1731.
Alexander by R. Stephens. Paris, Fol. 1548.
The sixth book of Paulus Aegineta.
Celsus. Leyden, 2 vol. 12 mo., 1730.
Caelius Aurelius. Amsterdam, 4to. 1709.

### ACKNOWLEDGEMENTS

[This manuscript has been printed without change or emendation. The writing is so perfect that in only one or two places, is there any possibility of mistaking even the final letter of a word. The punctuation, capitalization and spelling has also been faithfully reproduced, and while in many points there is a difference from our present custom, this is not to be construed as a lack of care on Dr. Heberden's part, since in his orthography, he was in essential agreement with the custom of the period in which he was writing.

Practically every one of the list of books can be identified, most of them easily, especially those that constitute the classics of our art, although he does frequently mention a medical book in a manner familiar to the medical student, but repugnant to the trained librarian. One of the authorities that he praises I have not been able to find. In one place he speaks of the new theories of Sympson as better than those of Freind. This author I have not been able to identify.

The investigation of Heberden and his work was made a delightful pleasure by the courtesy of everyone who was in a position to help me. The resources of the libraries of the Royal College of Physicians, Royal Society of Medicine, and the Royal College of Surgeons, London, were placed at my disposal by those in charge and to each and everyone of the officials of these Institutions, I owe heartfelt thanks.

My friend, Mr. Roger Ingpen, was good enough to take upon himself the task of investigating the Heberden manuscripts in the British Museum, while Mr. H. R. Pink performed a like service in looking up the source material in the library at Cambridge.

Mr. Felix Neumann has always helped me in every way with the resources of the Army Medical Library and gave me much valuable assistance in this case.

Mr. Emery Walker took more than the usual commercial interest in reproducing the Beechy portrait of Heberden which has hung so long upon the walls of the Royal College of Physicians' library.

Mr. John Burns, on a delightful Sunday afternoon in London, took me in fancy over Georgian London, until we had definitely located the residence of Heberden in the the famous house of Nell Gwynne.

Mr. C. S. J. Thompson, the author of so many books on Medical History, directed my attention to "Herberden's Ink" and the persistence of Heberden lore in the minds of medical students as late as the eighteen nineties.

The Editor and Publisher of the ANNALS OF MEDICAL HISTORY have been most accommodating, and have taken unexampled care in reproducing this manuscript; to them and their assistants, I am deeply indebted.]

# EXTRAORDINARY DELIVERY OF RABBITS

*By* W. E. AITCHISON ROBERTSON, M.D., D.SC., F.R.C.P.E.

EDINBURGH, SCOTLAND

IT seems almost incredible that people, educated people, could believe that women could bring forth creatures not human. But the distinguished Thomas Bartholin (1616–80) tells of a gentlewoman of Hersinar who was delivered of a great rat, which to the great astonishment of the assistants, ran away with great celerity and was never seen again. He relates also the case of a woman of Poland who was brought to bed of two small fishes without scales, which were no sooner born than they swam in the adjoining waters as naturally as do other fish.

Thomas Fienus in his work "De Viribus Imaginationis" (1757) tells of a girl who was born without a head. Her mother during her pregnancy had longed for a dish of mussels, but was disappointed. Her infant when born had two valves like a shell fish in place of a human head. These opened to allow the pouring in of nourishment and this kept the girl alive until she was eleven years old. This case however, partakes more of the nature of maternal impressions influencing the fetus.

In the case about to be described we find several educated men, two hundred years ago, firmly convinced that a woman of Godalming, in Surrey, had given birth to eighteen rabbits.

John Howard, who attended the woman during the whole time, was a surgeon who had practiced midwifery at Guildford for more than thirty years and was accounted a man of known probity, character and capacity in his profession. Is it possible to believe that he was so simple as not to know that Mary Tost was committing a fraud? On the other hand if he were accessory to the deception what was his object? Could he really have imagined that the deceit would escape detection? It would almost appear so, for we find him asking the King's surgeon to recommend both himself and Mary Tost to the King in hope of receiving pensions. If again it was mere notoriety he was after, he must have been a fool, for exposure was certain to follow. It was an age of great credulity, however the scheme was too ridiculous to attract adherents. The preposterous Darien scheme had just robbed thousands of Scotsmen of their savings and hundreds of their lives. Witchcraft was still believed in and in this very year (1726) a poor woman was burned as a witch at Darnoch in Scotland. The death penalty for witchcraft was abolished as late as 1735.

Yet this case of the "Rabbet-breeder" caused a great sensation at the time. The King himself, George I was much interested and caused his own surgeon, W. St. André, to investigate the case and report to him.

Now this W. St. André was not one on whom one could place much reliance. Probably a native of Switzerland, he came at an early age to England where at first he kept himself by teaching fencing and dancing as well as French and German. Somehow or other he became apprenticed to a surgeon who taught him anatomy and his knowledge of German brought him under the notice of King George I, who gave him the appointment of Anatomist in May, 1723. He never took any medical degree but seems to have practiced medicine and held the post of local surgeon to Westminister Hospital dispensary. Queen Caroline took a lively interest in the case of Mary Tost and at her instigation the King sent St. André to Godalming. Samuel Molyneux, Secretary to the Prince of Wales accompanied St. André.

In brief, the story concerns Mary Tost, the wife of a poor journey-man clothier who had already borne three children and had early in November begun to bring forth rabbits. W. St. André, Surgeon and Anatomist to His Majesty, gives a very particular and detailed account in "A Short Narrative of an Extraordinary Delivery of Rabbets, perform'd by Mr. John Howard, Surgeon at Guildford," published by W. St. André, Surgeon and Anatomist to His Majesty. The second edition, London was printed for John Clarke, at the Bible, under the Royal Exchange, 1727. He tells us that he read the account and that the facts were confirmed by two letters received from Mr. Howard; the first dated November sixth, in which he says that from the fourth to the sixth inst., he had delivered the woman of three more rabbits; that the last of them had leaped in her Belly for the space of eighteen hours before it had died, and that the moment it was taken away, another was perceived to struggle for birth.

The second letter dated November 9th, states that he had delivered "the poor woman of three more rabbets, all three half-grown, one of them a dunn rabbet; the last leap'd twenty-three hours in the Uterus before it dy'd." The letter reads further as follows:

> As soon as the eleventh Rabbet was taken away, up leaped the twelfth Rabbet which is now leaping. If she had been with child, she has but ten days more to go, for I do not know how many rabbets may be behind.

On the fifteenth inst, I (Mr. St. André) and the Honorable Mr. Molyneux, Secretary to His Royal Highness the Prince of Wales, arrived at Guildford (to which place Mary Tost had been brought). I was told the woman was actually in labour of the fifteenth rabbet. We found her dressed in her stays sitting on the bedside with several women near her. I immediately examined her. I waited for the coming on of fresh pains, which hapned in three or four minutes, at which time I deliver'd her of the entire trunk, strip'd of its skin, of a Rabbet of about four months growth, in which the Heart and Lungs were contained with the Diaphragm entire. (They tested the lungs in water and they floated). Her pains were pretty smart, and lasted for some minutes; they went off the moment she was deliver'd, and she seem'd cheerful and easy; walked by herself from the Bedside to the Fire, and sat on a Chair, where I examined her, and found, that in the course of the Fallopian Tubes, there were some Inequalities, but more sensible on the right side of her Belly; which made me conjecture that the Rabbets were bred in those tubes, and only came into the Uterus, when they gave her those agitations, which were sensibly felt many Hours before their Exclusion.

There was no Bleeding from the Vagina or laceration of the parts. Milk was present in one Mamma. She had no great appetite and then only for Beef. Two hours after we left, the nurse in attendance delivered her of the lower part of a Male Rabbet. That same evening; she fell again into violent Labour-Pains, insomuch that four or five Persons could hardly confine her to an Arm-Chair. I examined her and found the Vagina perfectly clean; and the orifice of the Uterus so far closed, as not to admit of the little Finger. I constantly stood before her, nor did any person whatsoever touch her, during the Time. After three or four very strong Pains that lasted several minutes, I delivered her of the skin of the above-said Rabbet, rolled and squeezed up like a ball, without the least Moisture or Blood upon it, upon which she recover'd of her Pain.

From that time I did not stir from before her, nor did I withdraw my Hand, but to deliver the skin to a stander by. About ten minutes later I again deliver'd her of the Head of the Rabbet. With the furr on part of one of the Ears being torn off, also without any Blood or Moisture.

They then examined the several Rabbets, which were preserved in Spirits of Wine. The first did not appear to be a perfect Rabbet, three of the Feet being like the Paws of a Cat, as did also the Stomach and Intestines. All the other thirteen Animals were like well-formed natural Rabbets from the size of two months growth to four. They were all broken in Pieces, and much in the same manner. M$^{r}$. Howard told us that First the four Paws with the Furr on came away, then the Liver and Intestines; the Trunk and shoulders in another; then the Ischium and Thighs in one piece with the Loyns; the Head with its Furr, and lastly, the Skin. The Viscera were wanting in four or five. The Bones were in all respects, like the Bones of

Foetus Rabbets. This proves in the strongest Terms possible that these Animals were not bred in a natural Way; nor will there be any doubt remaining when those facts which are subservient to the Circulation of the Blood, and Nourishment between an adult Creature and its Foetus are brought away; which I am fully satisfied must shortly happen, or, if retained, be the cause of this Woman's Death.

All these Facts were verify'd before His Majesty, on Saturday, Nov. the 26th by an anatomical Demonstration of four of the Rabbets.

By several Questions which I put to her, I was informed, that she was born and bred at Godlyman (Godalming). She was strong, healthy and fair; of a very stupid and sullen Temper. She has been married about six years to one Joshua Tost, junior, a poor Journey-man Clothier by whom she has had three children. Her account was that on the 23rd April last, as she was weeding in a Field, she saw a Rabbet spring up near her. This set her longing for Rabbets, being then, as she thought, five weeks gone with Child. Soon after another Rabbet sprang up which she endeavoured to catch. That night she dreamt of Rabbets and from that time for about three months she constantly desired to eat Rabbets, but because of her poverty could not procure any. About seventeen weeks after her longing she was siezed with a Flooding and miscarried what was like a lump of flesh. Three weeks later she had another miscarriage. On 27th September, she was taken ill and voided something like the Lights and Guts of a Pig and Mr. Howard some days later delivir'd her of some parts of the Animal first mentioned. After a Fortnight she was churched and thought all was over with until Mr. Howard deliver'd her of one Rabbit after another. Mr. Howard declared that when she was delivered of one Rabbet, another was immediately felt in her Belly, struggling with such violence, that the Motion thereof could be sensibly felt and seen. That this Motion has sometimes been so strong, as to move the Bed-Clothes, and that it has lasted for twenty and above thirty Hours together. This particular Fact was unanimously agreed on by most of the people of Guildford (to which place she had been removed by Mr. Howard). When her Labour-Pains came on, the Bones of the Animal were sensibly heard to snap, and break by the violent Convulsive Motions of the Uterus. He further added that she had had four breakings of Waters in the coming of the Rabbets. On Wednesday 23rd inst. Mr. Howard told us that she had been delivered of two more Rabbets. I watched her in Pains and toward eight a Clock that Evening she voided a Piece of a Placenta rolled up like Parchment and when unrolled it measured about six inches over. Next morning she passed a similar piece with exquisite Torture.

Mr. Ahlers having been at Guildford by his Majesty's Order "was fully convinced of the fact, having assisted the greater part of Sunday the 20th inst. at the Delivery of some of the 16th Rabbet, which he brought to Town with him." Then follow affidavits by Mr. John Howard, Mrs. Mary Tost, Elizabeth Helmes, Olive Sands, Thomas Howard, surgeon, attesting that Mr. Ahlers was firmly convinced of the truth of the delivery of Rabbets.

It seems curious after all these assertions that Mr. Ahlers was convinced of the actual birth of Rabbits, that he should write a complete denial in December of the same year. This denial is entitled "Some Observations concerning the Woman of Godlyman, in Surrey. Made at Guildford on Sunday, Nov. 20, 1726 Tending to prove her extraordinary Deliveries to be a Cheat and Imposture, By Cyriacus Ahlers, Surgeon to His Majesty." London, 1726, in a postscript to the preface, he states that "Dr. Steigerthal had all along suspected the whole affair to be a fraud and Imposture" and that he wishes the public knew this:

Mr. Howard told him that she had just fallen in labour with the sixteenth Rabbet. The nurse told him that the skin had just dropped from the patient. Mr. Howard examined Mary Tost but I was not permitted to do so. I examined the skin which felt warm and generally dry and with no trace of blood nor any appearance of water or membranes. I asked Mr. Howard how it was possible for the animal to have been stripped of its skin in the woman's belly. He answered that it must be due to the violent pressure of the womb against the Os Pubis. I was surprised that there was no swelling of her

Belly and no milk in her breasts. I observed that as she walked about the room she kept her knees and thighs press'd close together as if she was afraid something might drop down, which she did not care to lose. Not long after, she pretended to fall in labour; holding the back of a chair she began to squall and roar and to move the upper parts of her Body in a very strange manner and kept her knees press'd close together.

M^r^. Howard and I laughed at some topic in which the woman joyned. Later on I examined her and found a fleshy mass with some bones protruding from the orifice of the Vagina which was extremely dry and contracted. It was the hind part of a Rabbet without the least drop of blood or any moisture. I took hold of it and drew it out with all imaginable ease. By this time I began to conceive a violent suspicion of the whole matter but thought fit to conceal it. Nay, I feigned a great Compassion for the Woman's case. M$^r$. Howard told me what pains he must have been at, and still took, and what the poor woman had suffered; and that he hoped His Majesty would be so gracious, when all was over, as to give them a Pension, there being many that had Pensions, who did not deserve them. I promised that I would not fail in my Report to His Majesty to remember them both in the best Manner I could. Shortly after M$^r$. Howard presented to me the fore part of a Rabbet which he had deliver'd. There was nothing remaining but the Head, Intestines and Feet.

As I was not permitted to make any other examination of the woman, I determined to return to London. I took back with me the parts of the Rabbet which I had seen deliver'd. On examining these, I found that the third vertebra had been cut through with a sharp instrument. The forelegs had also been cut, and the left radius and ulna were entirely wanting. The fore and back parts had also been separated by a sharp instrument. In the excrement in the large intestine. I observed small bits of hay, straw and corn.

Another pamphlet relating to this rabbit-breeder and denouncing W. St. André for his belief in the woman of Godlyman is entitled "Remarks on a Short Narrative of an Extraordinary Delivery of Rabbets, perform'd by M$^r$. John Howard, Surgeon at Guildford. As published by M$^r$. St. André, Anatomist to His Majesty with a proper Regard to his intended Recantation by Thomas Braithwaite, Surgeon; London, 1726. Price 6$^d$."

"T'is well known" he writes "that the Town has lately been amused with idle Relations by the Gullivers, St. André's and Howards of the Age."

And notwithstanding the Fraud is detected, An Account of the Delivery of the Eighteenth will be soon published. When I reflect upon this strange Gallimatias, I am chagrined to think that the valuable Arts of Surgery, and Anatomy must necessarily be brought into Contempt by such monstruous Relations.

He pulls Mr. André's account to pieces, and shows that a cat had been cut up as well as Rabbits in order to deceive, and demonstrates that what Mr. André took for fetal rabbits were ordinary full-grown ones. In refutation of what Mr. Howard affirmed to be a piece of chorion which he took from Mary Tost, Dr. Braithwaite quotes from Sir Richard Maninghams' diary:

He had withdrawn a piece of hog's bladder from the Vagina, and had assured them that it never came out of the Uterus. The woman seemed much concerned at what I said and cry'd. The women about her said it was because she suffered. I thought her a cheat. I noted that the feet of almost all the rabbets had been cut off to prevent scratching; so careful were some of the coney-catchers of hurting the poor innocent Rabbet-breeder.

He also quotes an advertisement dated thirteenth December, 1726 of a Dr. J. Hamp, M.D. in which he says that Dr. André had made use of his name without his knowledge and consent "and which I never should have given in a Matter the Truth of which I did not believe."

Next we come to a lampoon entitled:

The Anatomist Dissected or the Man-Midwife finally brought to Bed, by an Examination of the Conduct of Mr. St. André, Touching the late pretended Rabbit-bearer: as it appears from his own Narrative by Lemuel Gulliver, surgeon and Anatomist to the King of Lilliput and Blefusen, and Fellow of the Academy of Sciences at Balnibarbi; 2nd edition, Westminister 1726 Price 6$^{d}$.

Our author goes over Mr. André's statements seriatim and traverses them. In reference to the character of Mr. Howard as one of known probity, he says that the name is as notorius at Guildford and the parts adjacent for denoting a whisker (i.e. braggart) as ever mine was at Redriff for establishing a Truth "and in the gut Illium of the Cats, M$^{r}$. André thought he saw a mass like a very small fish bone, i.e. the bones of a herring which the creature had devoured a few hours before it was thrust into the Vagina of Mary Tost. "He laments:

> the Great Detriment like to accrue to our Nation by the Stir which has been made about this foul Imposture, both by the Actors and Examiners of it, as well as in relation to those obscene and indecent Images, which for more than these nine days last past, beyond all example, have fill'd the Minds, and furnish'd out the Conversation of People of all Ranks, Ages and Conditions. And whether Ideas of this Nature are fit to be put into the Heads of rude Boys, Boarding-School Girls, and Old Maids, I leave every discreet and prudent matron to judge.

The closing scene of the comedy is furnished by Sir Richard Manningham (1690–1759) the famous man-midwife. The son of a Bishop, he was brought up for the church; educated at Cambridge, he took the degree of L.L.B., in 1717. He practiced in London where honors came early to him, elected a Fellow of the Royal Society in 1720, he received knighthood in the following year. He was the first in Great Britain to establish a maternity hospital, which he did by opening a ward in St. James Hospital, Westminister and there he lectured on midwifery, for many years.

On November 28th, 1726, Mr. St. André sent word to Sir Richard that it was His Majesty's pleasure that Sir Richard should accompany him to Mary Tost to investigate the wonderful case. As a result of this inquiry, we meet with the concluding chapter in the farce.

> An Exact Diary of what was observ'd during a close Attendance upon Mary Tost, The pretended Rabbet-Breeder of Godalming in Surrey, from Monday, 28 Nov$^{r}$ to Wednesday, Dec. 7 following, together with an Account of her Confession of the Fraud by Sir Richard Manningham, Kt. Fellow of the Royal Society, and of the College of Physicians. London, 1726.

The narrative proceeds:

I along with M$^{r}$. St. André and D$^{r}$. Rimborch (a German Surgeon and man-midwife) arrived at Guildford on 28$^{th}$ November. I found no signs of pregnancy present.I asked when the Rabbets had last leapt and the women present said about 1 o'clock in the morning. At five o'clock I returned with M$^{r}$. Howard and asked if he thought the Rabbet was dead. He said that if hot Clothes were applied, the Rabbet if alive would leap again. I immediately ordered Clothes to be made very hot and apply'd them myself to her Belly. The motion soon began which they called the leaping of the Rabbet. It was indeed a motion like a sudden leaping of something within the right side of her Belly where I had already felt a particular hardness. These motions were various sudden jerks and tremulous motions. We then left, but in less than an hour M$^{r}$. Howard brought us a piece of membrane which he insisted was part of the Chorion, though to me it looked like a piece of bladder. At 8 o'clock I touched her and in the vagina perceived with my Forefinger somewhat like a piece of skin, the os uteri was quite closed. I took out of the vagina what lay in it and was surprised to find it like a piece of Hog's bladder. I asked for a Hog's Bladder and they presently brought one fresh blown up which it seems they had in the house. This added to my Jealousy. I compared these and found no difference, both had the same strong urinous smell peculiar to a Hog's bladder.

M$^{r}$. St. André added that had he not actually delivered the woman of part of a Rabbet from the very uterus itself, he would have believed the whole a Fraud. On returning to the White Hart I told them that the piece of Hog's bladder had been artfully conveyed into the Vagina. Very warm Disputes arose amongst us. M$^{r}$. St. André stating that he was convinced of that Truth by examining the Rabbet he had taken from the Uterus.

On Tuesday 29th we brought Mary Tost to London with us and lodged her at Mr. Lacey's Bagnio in Leicester Fields.

Wednesday, the 30th I told the story of the Hog's Bladder to his Grace the Duke of Richmond, the Duke of Montague, Lord Baltimore and Mr. Molyneux.

Friday, 2nd inst. She had pains which they called the leaping up of the Rabbet. These increased towards evening when she fell into violent Convulsions with contractions of her fingers, rolling of her Eyes, and great risings in her Stomach and Belly. These continued during the next day also.

Sunday 4th Inst. Dr. Douglas, the most famous accoucheur of his day, and I carefully examined her and found a swelling above the os pubis. At 3 in the afternoon Pains like labour pains came on and the room being very full, several persons examined her and all thought that something would issue from the Uterus, but all the symptoms vanished suddenly.

In the evening, Thomas Howard, Porter to Mr. Lacey's Bagnio, made an information against Mary Tost, before Sir Thomas Charges Bart. J. P. concerning a Rabbet she had clandestinely procured by his Assistance. Upon which she was taken into custody and strictly examined by Sir Thomas. She very obstinately denied all that the Porter had sworn, but her sister acknowledged the procuring the Rabbet in a Clandestine manner but was for eating only. Soon after Mary Tost also confessed to getting the Rabbet, but it was her intention to eat it, she having long'd for it, and most obstinately persisted that she was still big with a Rabbet.

I examined her that evening and as her Uterus seemed to contain something, I Earnestly pressed that she might not be sent to prison that night.

I wrote to Mr. Molyneux stating that a committment to Prison would prevent a discovery of the Cheat, but that rather she should be kept and more watched in some private House, till the Matter be as fully and plainly detected as possible. She therefore remained in the Bagnio under the Custody of the High Constable of Westminister.

Tuesday 6th. Sir Thomas threatened her severely and appear'd the most proper physician in her Case for we heard no more of her former Labour-like Pains. I urged her very much to confess the Truth; and told her I believ'd her to be an Imposter, and that she was differently formed from other Women, having some peculiar way of conveying pieces of Rabbets into her Uterus and of imposing upon the World, and therefore I was resolved to try a very painful experiment upon her. Whereas if she would confess, I should speak to several of the Nobility on her behalf, she at last begged very heartily to be let alone till the next morning.

Accordingly on Wednesday, December 7, in the morning, in the Presence of two Noblemen, Dr. Douglas and myself, she began her Confession of the Fraud: and in her Confession she own'd that upon her miscarrying she was seized with violent Floodings, and the womb was then as she thought open, as if she had been just deliver'd of a full-grown child, she did verily believe one of her wicked Accomplices did then convey into her Womb part of the Monster (as she calls it) being the Claws and Body of a Cat, and the Head of a Rabbet; this put her to much pain. After that time she believed nothing was ever put into her womb, but into the passage only by the advice of a woman Accomplice whom she has not yet nam'd, and who told her she had now no Occasion to work for her living as formerly, for she would put her in the way of getting a very good Livelihood, and promised to supply her continually with Rabbets and should therefore expect part of the Gain or to that effect. Mary Tost asked her what that way was. The Woman told her she must put up her Body so many pieces of Rabbet as would make up the number of Rabbets which a Doe Rabbet usually Kindles at one time, otherwise she would be suspected. From that time Mary Tost did often by the Assistance of that Woman, convey parts of Rabbets into her Body, till at last she could do so by herself as she had an opportunity. Now by the constant Irritation of these extraneous Bodies, the whole Uterus suffered much, and became larger than it ought to be, and the Bones and other Parts of these Rabbets so conveyed into the Vagina, did often offend the neck of the Uterus, which together with artful management of herself, did occasion these violent bearing-down pains which very exactly counterfeited true Labour Pains. The Motions of her Belly were partly artificial and partly real convulsions. She owned that there was nothing in her passage when I examin'd her, only the piece of Bladder which I took from her. Ever since that Time she was afraid to put anything into her Body, because I had often told her that if I found twenty Rabbets in her body it would go for nothing with me for I should never be convinc'd unless I took parts of Rabbets from out the Uterus itself.

Thus have I given a full and faithful account of every material thing which occurred during my constant Attendance upon Mary Tost which I thought myself oblig'd to comunicate to the World, as well for their satisfaction, as for the Justification of my own Conduct.

(signed) R. Manningham

Then follow several Depositions relating to the Affair of Mary Tost taken before the Right Honorable the Lord Onslow at Guildford and Clandon on the third and fourth of December, 1726. Edward Costen of Godalming swore that he had sold to Joshua Tost two rabbits. Richard Steedman, a weaver of Godalming swore to selling to Mary Tost's husband two Young Rabbets at an interval of two days and the latter said to him "You must not let anybody know it, for I may have occasion for the others" and accordingly he had the other for twopence because it was very poor and small.

John Sweetapple, a Quaker, affirmed that he had sold to Joshua Tost three Young Rabbets.

Mary Peytoe declared that she had sold to Joshua Tost nine or ten young rabbits.

Mrs. Masin, with whom Mary Tost lodged for about three weeks, made oath that she "had neither dress'd nor cook'd any Rabbets for Mary Tost" and that she had heard her say that she could not eat a bit of a rabbit was she to have a thousand pounds for so doing.

Mary Costen swore that she was hired about a month ago as nurse to Mary Tost; that she never saw any rabbits brought to her to eat nor any dressed in the house; that she herself saw Mary Tost deliver'd of seven rabbits of different colors all of which came from her in several pieces and not whole; that she never saw Mary Tost's husband dejected or concerned about his wife's misfortune; that she never heard her or her husband desire that any Minister should be sent for to pray by her, and that Mary Tost generally fed on salt beef and drank some times strong or small beer or wine: That she would stand by the Truth, if the King were to send for her and that she would not do an ill-thing for a lap-full of guineas; and that she never saw Mary Tost delivered of any guts belonging to the seven rabbits she saw her delivered of.

On December 9th, 1726, Mr. St. André published in the *Daily Journal* an advertisement in which he says:

> Having contributed in some measure to the Belief of an Imposter and having been since, instrumental in discovering the same; so that I am now convinc'd it is a most abominable Fraud; I think myself obliged, in strict regard to Truth, to acquaint the Public thereof; and that I intend, in a short time, to publish a full account of the Discovery which misled me in my apprehensions thereof; and which as I hope they will, in some measure, excuse the Mistakes made by myself and others, who have visited the Woman concerned therein; will also be acceptable to the World, in separating the Innocent from those who have been guilty Actors of this Fraud.

The unfortunate man seems now to have made his exit from public life. The exposure and confession of the fraud brought any amount of ridicule on poor St. André and he made but one last appearance at court. Though he seems to have retained the part of King's anatomist, he drew no salary subsequently.

A fama arose on his marriage with the widow of his friend, Molyneux. The latter died suddenly in the House of Commons on April 13th, 1728, and that same night the widow, Lady Elizabeth, second daughter of the Earl of Essen, and St. André left London and were married on May 17th, 1730. It was rumored that St. André had poisoned his friend, so as to marry his widow. The scandal was great and the Queen dismissed Lady Elizabeth from the

Court. The lady was however very wealthy and the couple lived near Southampton for upwards of twenty years. After her death, however, St. André became reduced in circumstances and his after life did not redound in any way to his credit. It must be confessed that his abilities had never warranted his elevation to a post which he had secured merely through favor.

The chief actress in the drama, Mary Tost, was imprisoned in Tothill Fields as a vile cheat and imposter for a short time. She then returned to Godalming, where in 1740 she was prosecuted for receiving stolen property. She died in 1763. Hogarth has caricatured both Mary Tost and St. André in his plate "Credulity, Superstition and Fanaticism."

[Matthieli: Senensis Medici, 1570.]

# THE EVOLUTION OF THE PHYSICIAN'S ATTITUDE*

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NEW YORK

LOST in a colossal maze of objects, it is imperative to seek order, if for naught else than to save one's self.

> But often, in the world's most crowded streets,
> But often, in the din of strife,
> There rises an unspeakable desire
> After the knowledge of our buried life,
> A thirst to spend our fire and reckless force
> In tracking out our true, original course.

The order we desire is not always of a physical character. The issue is not always bent upon a correlation of facts on the surface, but of such facts and concepts as are a little beyond tangibility. Furthermore, facts are not always as essential as motives and a lucid understanding of the mainspring of the whole, of the "true, original course" is a relentless need. Medicine today is one of the world's most crowded streets, and it is not in the street itself that one ought to seek the grounds for being there. With us the ultimate motive is at a very great distance and one is apt to forget the enormous power of that distant force. In many a matter, distance is none the less powerful through its immensity. Our dwellings and cities are built on strata supported by the antiquity of the Jurassic, the Carboniferous, the Silurian; and our activities are likewise derived from and ultimately supported by those remote ancestors lying beneath the Diluvial and beyond. They carry the answer to the doubting, unsettled actions of our life.

These actions are varied, to all appearance, without limit. Nevertheless, to reduce them to a universal formula which would enable us to advance with eager minds and yet at peace, we have to ask: Is it knowledge that we wish primarily to gather for its own sake or is it some utterly different principle which urges us on the crowded, gasping street? The answer clearly is that knowledge is of secondary importance with us, that even, if it be gathered, it is gathered to be immediately turned to purpose; and what is more, our race has set out with a purpose unrelated to any intellectual activity. Phases of mental life have not evolved in parallel fashion. In remote preanimistic ages, Man was a creature of emotions and will, without thought. If medicine is viewed in the light of this widespread psychological conviction of emotionalism, that *feeling* gave rise to primeval *actions*, it will simply be the expression of a will to help, a will which satisfies emotions of untold antiquity. A conclusion which bears treasures of great sweetness, for in throwing upon us the beacon of a universe in which we do not stand in lonely grandeur, it lights up the ocean of the past and provides safe guidance for the future. Thus, eudamonistic theory stands behind all medical activity: to create well-being and happiness in giving and receiving.

The very first attitude of the primitive physician was one of naive empiricism. The method of trial and error was applied and a crude pragmatic utilization of experience showed the way to relieve pain, restore function, provide safe childbirth, give protection against poisons and injuries.[1] Help was craved by its object alone and help was readily given. Herodotus tells of an ancient Babylonian custom of exposing the sick on highways where the pity and experience of the passers-by was invoked.[2] Strabo tells of similar occurrences in ancient Lusitania.[3] They recur again and again as examples of the failure of self-help and reliance upon the functioning of an empirical apparatus. "The origin of medical art is this: that some were healed and others died and thus the harmful was distinguished from the useful." This, then, was the original method of medicine, and it implies that the dispenser of advice *knows*. The lay healer, with his naturalistic empiricism, no less than the supernatural medicine man of a later period, had to have a confidence in his knowledge when approaching his savage patient. Anthropologists assert that primitive patients are prone to a deep despair and despondency,[4] characterized by some as "thanatomania"[5] and that for them security lies only in belief in their healer's knowledge. Old Sumerian texts call the physician "the son of knowledge." Upon his mercy the stricken one throws himself with all his desperate clinging to life. Thus the physician's first attitude grew into a modified, a self-conscious empiricism.

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* Alpha Omega Alpha lecture, delivered at the Yale Medical School, March 25, 1926.

With awakening thought, however, an etiology is rapidly sought. The crude empiricism gives way to demonology and the primitive healer becomes a professional medicine man, privy to the animated world of disease and its cure. His inherited empirical knowledge is increased by formulae of a hitherto unknown etiological therapy. The intellect at its very dawn seeks for a cause, and finds it in the most obvious concept at hand. African pigmies of the Ituri forest perform post mortems on their dead: if a foreign body is found, it is proclaimed forthwith to be the cause of death, if not, the supernatural world is called upon.[6] After alien bodies come insects and after them the realm of demons. Let us be aware that this is our very spirit, the scientific spirit of search we pride ourselves upon. This spirit prompts the neolithic man to perform strange operations of trephining, "*rondelles*" are cut out of the skull with rude Acheuléen flints, or "*T-sincipitales*" are being carved in it[7]; occasionally, to relieve headache and maybe to decompress, but mostly to realize some demonopathic belief. The medicine man's rank grows: he now flies in the air, seen by the awed savage, or converses with the demons. Thus his attitude is not that of the neighbor, the experienced, kindly, but simple healer any more, of the same clay as his fellows, he is isolated from them in his endeavor to seek methods of healing exclusively. But this opening of the mind means something more: for here was developed a type that seeks to know *cause and consequence, that goes beyond the immediate task of relief* and searches out things not any more tangible to all. With him is injected the spirit of thought, as separated from the primeval and immediate task of healing, into medicine and the foundation laid for the tragic struggle of intellect which is the story of this lecture. While the problem of the empiric was the man and his distress, the medicine man deals with the *disease*, its cause and cure, the empiric leaves the stage. Today medical science again deals with disease, its cause and cure, and once more little room is left for the patient and his suffering.

With the awakening of intellect, the patient was linked up with the world, whereas in a preintellectual age, he was an object in himself and an aim unto himself. The intellect searches etiology, causality, it transcends the realm of immediate sense perception; and these entirely new mental processes obscured the primary emotions on which healing activity was based. In this connection an inquiry into methods is irrelevant; for in this antithesis alone is sufficiently apparent the real *Leitmotiv* of medicine: originally an approach of the isolated sufferer, later an approach of his disease which hangs together with other, known or unknown, connected or disconnected forces of the universe. This shift was inevitable, being due to fundamental facts of mental evolution, and though it meant a thorough change in approach, it did not affect the appeal for help; it transformed the physician, but not the patient. When in the damp sultriness of his terramara swamps, dread demons of chills, fever, headache and convulsions, swung down upon him, his fears were increased, not diminished by his intellectual growth. What stupendous personification of disease, revealing this exaggerated terror, unfolds in an ancient Babylonian cuneiform text:

> The head disease roams in wildness, raging like the wind,
> Flaming like lightning, tearing along above and below,
> Crushing him who fears not his god like a reed,
> Cutting his sinews like a khinu-reed,
> Maiming the limbs of him who has not a protecting goddess,
> Glittering like a star of heaven, flowing like water,
> Besetting a man like a whirlwind, driving him like a storm,
> Killing that man,
> Piercing another as in a cramp,
> So that he is slashed like one whose heart has been torn out,
> Burning like one thrown into the fire,
> Like a wild ass whose eyes are clouded,
> Attacking his life in league with death,
> So is Ti'u, who is like a heavy storm whose course no one can follow,
> Whose final goal no one knows.[8]

In accordance with like conceptions, the physician became a leech or priest, his medicine a theurgy; but proportionately, as he rose in the intellectual scale, he sank in the emotional one, loosening his ties with humanity. In On, Memphis, Thebes, Sais as well as in Epidauros, the healer acted definitely as an interpreter of the forces of the world, with a great scope in view and immensely more advanced than his empirical sire. The writer of the Ebers Papyrus says:

> I come from Heliopolis with the priests of het-âat, the Lords of Protection, the Kings of Eternity and Deliverance, I come from Sais, with the divine mother's who we shield. Words were given me by the Lord of the world which removes the suffering of all gods and all deadly diseases.[9]

Heroes of healing were thus readily evolved and in pre-Hippocratic Greece the man of medicine loomed austerely above other mortals. However, these men of medicine were very divergent in their method of approach. Remnants of simple empiricism were still present, but a chase for principles, for a correlation of facts and ideas had already begun. Out of this entanglement of motives, a medical deontology was consciously developed by Hippocrates. Much later the empiric school utters words that might have been his, "It is not important what brings forth disease, but what removes it." In this sense Hippocrates concentrates upon the future, prognosis and therapy. It should not concern us now, what his method of solving problems was, but what these problems really were like. They were entirely of a prognostic and therapeutic character, and every carefully observed and recorded symptom was used to determine the outlook and possibly to aid a treatment suggested by the course of the disease as foreshadowed by the omnipotent symptom. Symptoms were after all only signs of a given person's reaction to disease, they were not the disease itself. We are concerned with the patient and not the disease; this was the dominant note of Hippocratic medicine. Diagnosis is wholly left by one side, for its establishment does not contribute anything, under the circumstances, to the solution of the task of the physician, which is to comfort, reassure and heal. A thorough pragmatic trait winds around his entire procedure, designed to solve this task, the "true and original" task, without being sidetracked into pathologic and diagnostic speculation, for which times and men were utterly immature. Man is thus once again severed from the relentless ruling powers of the world, set on his own feet and regarded in his own light. With this deliberate return to a single-purposed humanism, an emotional contact is rëestablished. "For where there is love of man, there is also love of the art"[10] and the here pronounced φιλανϑρωπίη was intended to be a guiding reminder for all time to come. Genius has an outlook wider than his age, unlimited in time and space, and Hippocrates in putting his finger on the genuine axis of medicine issued a deliberate warning that "the art" cannot with impunity depart from this axis.

The three essential points in Hippocratic medicine are: the consideration of the individual as a whole; the recognition of the nature of his original need; and the pragmatic attitude as to the fulfillment of this need. His attitude thus reverts from the priest to the empiric, incomparably more varied in conscious experience, but nevertheless the same. It would be futile to discourse on Hippocratic "science." A modern point of view would willingly characterize his procedure as scientific, for his method was one of *a posteriori* verification; nevertheless, it must be kept in mind that he never sought a fact for its own sake and thoroughly disdained principles, systems, classifications and axioms. His philosophy was a practical one and caused him to convert his *a posteriori* data of knowledge into judgments of value. He never bothered about a scientific epistemology. The Ionian cosmological systems had no lure for him. Much as Plato, Democritos, Pythagoras, Heraclitus stamped with their rising metaphysics the medical thought of those after him, they left him unaffected. Although he proudly claims "that a physician who is a lover of wisdom is the equal of a god" (ἰητρὸς γὰρ φιλόσοφος ἰσόθεος), this cannot be interpreted as referring to a technical φιλοσοφία; Goethe would have said about him: "Er hat nie über das Denken gedacht." Listen to his pragmatic method: "Such food as is most grateful to the patient, though not so wholesome, is to be preferred to that which is better though distasteful."[12] This is the rationalized primitive physician, the sympathetic helpfulness of one who "*non ignara mali, miseria succurrere discit*."[13] An integration was constantly attempted: "The course I recommend is to pay attention to the whole of the medical art"[14] where he is met again and complemented by another giant twenty-two centuries thence, Goethe: "Die Medicin beschäftigt den ganzen Menschen, weil sie sich mit dem ganzen Menschen beschäftigt."[15] The Hippocratic method shows exquisitely the discrepancy between physician and scientist and how difficult it is to match the two aspects of endeavor. He relies on no "theoria," nor yet on any reasoned deduction, but on what Aristotle calls εὐστοχια,[16] a sagacity, an acumen, a "happy guessing,"[17] in which outcome and fate are safely and confidently anticipated. Is this a method to be advocated? Is it one to be learned? It is not, as Hippocrates knew only too well but it is the method of a Nothnagel, a Dieulafoy, an Osler, all great modern clinicians who arrive at diagnostic and prognostic conclusions without *a priori* knowledge, nay, in spite of it. He, too, like these, knew how to rationalize and how to employ tests whose real substance none guessed: he throws sputum on glowing coals in order to determine by the subsequent odor the outlook for his tuberculotic patient, and similarly the modern internist performs the ritual of a diazo reaction for exactly the same purpose, manipulating unknown quantities and rationalizing a chance phenomenon.

This was the original, great, true physician, or, if I may coin the word, *Urarzt*. However the scientific attitude was also present, developed by the school of Cnidos, in Asia Minor. There the patient was approached with the primary aim of obtaining a diagnosis, a pathological classification which should be permanently valid; there the sick man was again submerged into a sea of phenomena, all challenging the intellect, all clamoring for recognition as causes or conditions clamoring not as supernatural demons, as before, but as natural forces, yet clamoring just the same. In the "Regimen Acutorum" Hippocrates turns against the Cnidians: "Your aims are absurd, for the number will be almost incalculable [of diseases] if a patient's disease be diagnosed as different whenever there is a difference in the symptoms, while a mere variety of name is supposed to constitute a variety of the illness." For, most certainly, we are not concerned with the disease, but with the patient. Unhappily, whereas he from the height of his εὐστοχία could disentangle the sick man from his symptoms, the Cnidians with their classification concealed him in them. Cnidos tears the sick man to pieces and correlates his symptoms with the world, like a child tearing apart her doll to satisfy a curious intellect, being unable later to reassemble it; Cos preserves man in integral unity and does not attempt to find the particular factors. Cnidos and Cos, Euryphon and Hippocrates are the two poles of medical attitude in the western world, unaltered ever since.

In the great break-up of the medical world into rigid schools, the Hippocratic tradition was mirrored by the thorough-going utilitarianism of the Empiricists. Already the Alexandrians, but particularly their successors, as Menodotos, emphasize the *a posteriori* method which finds expression in the famous tripod of experience, tradition and conclusions by analogy.[18] In method they follow thus the Coan school, being interested first and last in results and not in a system of necessarily ill-coördinated facts. The other schools, one by one, fell under the spell of metaphysics, as happens inevitably when the intellect becomes inquisitive and needs to quench its thirst. The thirst of volition and feeling may be quenched by action alone, that of the intellect is not so easily assuaged. The Pneumatists are pantheists, and man from them is again but a phase in the life of the universe in whom the vital fire, πῦρ τεχνικόν, the world's dynamic principle, finds a temporary home. The Dogmatists, building forth on Cnidian lines, stride far away from Hippocrates and are held fast by Platonic metaphysics. Diocles of Karystos, their foremost representative, creates a general pathology and a detailed diagnostic science. They are rationalists whose chief aim is to grasp scientific concepts and form them according to the *a priori* method. The Methodists embrace the ideas of Democritos Epicuros and the poet Lucretius; they, too, are primarily pathologists, though differing from the Dogmatists in a more strenuous effort toward integration. Their attitude very clearly illustrates the results of *a priori* thinking when carried into practice, a thing which is not, as it is generally said to be, a feature of the medieval mind. It is a feature of the metaphysical mind. The Methodist school, for instance, conceives of the body in the best tradition of Democritos, to be formed by atoms which are either close or distant, resulting in states of tension, relaxation, respectively. The treatment is at once deduced: it has to loosen, or again to strain and stretch, the famous principle of *contraria contrariis*, dominating in a sense for two thousand years. Little does this scheme take into consideration the sick person, his terrors and hopes, his true and unreasoned symptoms, all his bodily and psychic reactions to the disease! But the same is true of the other great schools, with the possible exception of the Empiricists, and when the time for the second monumental synthesis, that of Galen, arrives, it finds the medical world in a predominantly scientific mood. Galen, the eclectic, relies on both *ratio* and *experimentum;* and his practical mind does suggest to him the Hippocratic ideal of medicine; the stupendous material at his hands, however, threatens to overshadow by its very bulk the original *Leitmotiv*. Cases are now definitely but points in the illustration of theories, and the scientific, not the medical attitude is at the front. In felicitous blending Celsus seeks to give the patient his due, keeping well in mind the metaphysical scepticism of Hippocrates: is not medicine after all an *Ars conjecturalis*,[19] justified by its results? This educated and mild scepticism lightly colors the great scientific scheme of things which now as a ready made tradition enters the Middle Ages.

The following twelve hundred years are pregnant with these selfsame ideas. Their evolution, however, is not bound up with coexistent medical schools any more, but becomes associated with habits of thought deeply entrenched in the learned world. True, Christianity appears on the scene: and the Fathers of the Church, leaders of a lay community, draw attention to the nobler aspects of medical function. One of the cardinal Christian virtues is to minister to the sick; Clement of Alexandria, St. Jerome and others incessantly remind their readers of the original task, with a perfect purity of motive. A beautiful image of the Christian physician is painted by St. Methodius, of Aglaophon, in his "*De resurrectione.*"[20] The thought of immortality profoundly agitates his mind, emphasis slowly shifts from *health to life*, although for the time being only in a rudimentary, and maybe, negative way. But the idea of self-conscious, deliberate altruism, although as Prince Kropotkine asserts and I joyously admit, is of a fundamental nature; it is an idea which can be kept up only under the greatest difficulties in an advancing and complex civilization. The emphasis of Christian ethics did not change the attitude of the scientific medieval physician: he searched, classified, correlated, built out a discipline of disease, following therein Cnidos, Diocles, Galen and the eastern development of Ali-ibn-el-Abbas and Avicenna. The empiric mood of the fresh Arab civilization, as presented fragmentarily by such early writers as Rhazes, was soon superseded. The world indeed became a thoroughly moulded unit in its scientific determination, with the aprioristic, rationalistic method, seeking forever causes and connections in laborious analysis of disease. A symptomatology is present, yes, but only for the sake of a general pathology and a very rudimentary code of therapeutics, based always on irreversible principles of the "godlike reason." "*Experimentum est fallax, ideo saepe fallitur*"[21]: experience is fallacious and is often misguided. I merely wish to mention this intellectualistic epistemology, so thoroughly ruling the Middle Ages; all we have to see now is that it stamped the physician again a scientist and not a doctor. Of Gariopontus, the eleventh century Salernitan author, it is remarked that he was a learned man and a doctor too, separate and pointedly antithetic functions. This was the spirit officially perpetuated by the great universities of scholastic learning, Paris, Bologna, Padua. Still, this rigid spirit did not reign undivided. It was opposed not by a great synthetic mind, like Hippocrates, nor a polite doubter, like Celsus, but by a group of men of action who were face to face with dramatic emergencies and wanted immediate results. These were the surgeons, French and Italian: Roger Frugardi of Salerno, Jean Pitard, William of Saliceto, Lanfranc of Milan, Henry of Hermondeville, Guy de Chauliac. Their only aim was therapy, and in their work, derived chiefly from Hippocrates, Paul of Aegina and some of the Arabs, they thrust away the rationalistic attitude of scientific inquiry. The bitter antagonism between physicians and surgeons, manifested even in such outward struggles as the foundation of the Collêge de St. Côme in Paris, is an expression of the same difference that we have seen between the paleolithic healer and the medicine man or the one between Hippocrates and the Cnidians or the Empiricists and the Dogmatists. The situation is increasingly complex in each period, true enough, but the basic antithesis is there, mirroring the first, genuine psychological evolution of the human mind.

The surgeons constantly increased in power, and when men like Ambroise Paré or Pierre Franco appeared, in the sixteenth century, their therapeutic and empiric position shook the very foundations of dogmatic internal medicine. It was with difficulty, to be sure, that the surgeons rose to a height of true medical function. They had to wage a hard fight first, not so much with their adversaries, the physicians, as with themselves. A very crude form of stereotyped technical empiricism had to be overcome first, which came near discrediting all surgery. Coarse methods of herniotomy, lithotomy, handling of traumatisms, trephining etc. involved the most terrifying risks of hemorrhage, suppuration, gangrene, pain, peritonitis, septicemia, tetanus or meningitis; and in confronting these situations, the common, untutored surgeons exhibited an utterly inhuman attitude.

Lange in the early sixteenth century is shocked to see the rough army surgeon pour boiling oil into a compound fracture and when he asks for the reason for such a procedure, the reply is, "one has to suffer pain to get well." "It is not pain, but torture which thou inflictest upon me," moans the unfortunate victim.[22] The leading surgeons, of course, were busy developing good technique and even the mandragora-anesthesia of the Alexandrians was taken up by Ugo Borgognoni of Pisa, working on the Asclepiadic tradition: *tuto, cito, iucunde.* Ambroise Paré confronts the patient in a firm, human, manly fashion and in the recently edited "Practica" of Stromayr (1549)[23] we find many a trait of warm human sympathy. The final triumph of the spirit of action was achieved in the magnificent development of obstetrics in the seventeenth century, initiated by Rösslin and Paré and carried out by Mauriceau, Smellie, Van Deventer.

The empirical attitude, coming from these endeavors, kept hammering away, at the foundations of medicine proper. Galen becomes more and more discredited and the Renaissance undermines the Arab and the whole scholastic, dogmatic medieval scheme, hitherto considered scientific. As at all times of confusion and at the threshold of new things, one man arrived to powerfully take inventory and throw everything back to Hippocrates; Hippocrates, a man no more, but a principle. This integrator and reformer was Paracelsus. He dismisses the elaborate Galenic pathology of centuries and determines to be a physician working pragmatically, on results and for results, with total disdain of the everlasting attempts to create a pathology without *Man* as the pathologicum. Browning puts these words in his mouth:

> I possess
> Two sorts of knowledge; one—vast, shadowy,
> Hints of the unbounded aim I once pursued:
> The other consists of many secrets, caught
> While bent on nobler prize—perhaps a few
> Prime principles which may conduct to much:
> These last I offer to my followers here.

These last. Not the chimeric shadows his predecessors chased, forgetting their object and their "true, original course," those which he himself pursued in all the schools of Europe, but the new secrets, caught while bent on a nobler prize: to cure the sick man, to make him happy. "The physician grows in the heart, he comes from God, he belongs to the natural light, to experience," and "the true basis of medicine is Love."[24] Deliberate, proud reiteration of the Hippocratic position: ῇν γὰδ πὰρῇ φιλανϑδωπίη, πὰρ εστι κὰι φιλοτεχνίη, where there is love of man, there is also love of the art: a reversion to mankind's original position with the infallibility of genius.

A new era in thought is ushered in by the great metaphysical revival of the seventeenth century, the age of Spinoza, Descartes and Leibniz. The constant development of a mechanistic philosophy with the undercurrent of teleology arouses in them attempts to solve the psychophysical riddle, maintaining the continuity of the world which was now menaced. A widespread intellectual unrest and speculation culminates in them, an unrest which in the medical sciences produces Sylvius with the iatrochemists and Sanctoro with the iatrophysicists. Aims more or less identical with the medieval past return, the elaboration of a hazy general pathology is under way. The methods, of course, are different; experimentation has grown since Harvey, Leeuwenhoek, van Helmont, but this again is not relevant; the scientific attitude once again threatens to obscure the physician's purposes. The question is not whether a method is suited or not to the task to which it is applied, but what that task is. Undoubtedly the methods used in physiological investigation were the right ones, philosophically speaking, while those of the Middle Ages were wrong; but this one defect both periods had in common: that the physician again lost sight of his duty in his scientific zeal.

Sydenham came to the rescue of Hippocratic principles. The founder of clinical nosography did this by turning his attention to the sick man, by regarding his symptoms in their proper light, as symptoms which are not to be classified in themselves as entities and by insisting on observing his reactions as a whole. "A disease," to quote from his "Acute Diseases," "in my opinion, how prejudicial soever its causes may be to the body, is no more than a vigorous effort of Nature to throw off the morbific matter and thus recover the patient." In other words it is a battle in which the physician sides with nature (which is, properly speaking, the sick person); and throughout his works it may be seen how little he expected the physician to actively do in this respect, for "*primum non nocere*"[25] and everything will be well. Theories are to be refrained from and the practical duties of medicine adhered to. This is the simple, earnest, pragmatic attitude of Sydenham, whom the metaphysical trend of his age affected but very slightly, and it initiates the development of a new growth of medicine, of great schools, like the first phase of Vienna. Boerhaave, Van Swieten, and De Haën are the names connected with the new clinical thought; the latter are responsible for the transplantation of this thought to Vienna, where around 1740 modern medicine began. The Viennese clinicians of the eighteenth century, with Stoerk, the famous Auenbrugger and others, were committed to this empirical Hippocratism, to a rigorous method of observation which however slowly turned toward a diagnostic purpose. This shift aroused a need in the profession, a long-felt need for a therapy, which, although ever emphasized, remained wholly inadequate, a therapy which moreover was now threatened with deliberate neglect. This need created attempts like Hahnemann's homeopathy. Hahnemann sets down the therapeutic experiment as the mainstay of medical work and arrays symptoms according to their subservience to such an experiment. The therapeutic idea was a brave thought indeed, but being enveloped in a penumbra of fruitless speculation was soon doomed. No phase of medical activity may be severed from another without jeopardy to the whole structure.

This structure, so much dependent upon individuation, was imperiled again by the growing movement of *Naturphilosophie* in Germany: led by Schelling, hand in hand with two other philosophical tendencies, Hegel's and Fichte's abstruse idealism and the metaphysical cosmology in which everybody indulged, for the rapidly piling new discoveries compelled people to seek relationships between them. A new era of classification followed in which medicine was wrapped in philosophical terms. At the same time, however, a cold counterbalance was offered in the great French school of Laënnec, Andral and Louis. Here anatomical facts were sought and theories briefly treated. The physician's need was better perceived, true, yet the aim was first to reach a diagnosis and seldom to go beyond that. The shifting from prognosis and therapy to diagnosis is characteristic of medicine in the nineteenth century, and this tendency, if coupled with a growth of pathology, is apt to become *l'art pour l'art*, and this exactly happened. There was a more or less unexpressed philosophical reason for this turn. This reason was, and still is, the craving for causal explanation which, although originally metaphysical, was challenged by the mass of natural phenomena entering the minds. Thus a therapy was conceived to be valid only if supported by a causal connection with the actual events of the disease, which simply called for diagnosis; and this in turn valid only if sustained by a causal connection with the individual pathological processes making up a nosologic entity, which called for a pathologic and etiologic diagnosis. Even the anatomical diagnosis of Laënnec did not suffice, let alone the purely symptomatic diagnosis of *e.g.* Sydenham. Accordingly, medicine becomes a "special pathology," a "pathologie interne" of which therapy is but an appendix and nobody is concerned with the total value of medical procedure in the ordinary road of routine.

The position of the scientist, accumulating facts eagerly and with precision, individual facts pertaining to the disease but not to the patient is typified in what is commonly called the German medicine of the middle and late nineteenth century, particularly in men like Frerichs, Traube or Skoda in Austria. And here again, as throughout this paper, I am not inquiring into methods, although it may well be observed, parenthetically, that reasoned and defined conclusions are by no means enough to satisfy even this relatively modest diagnostic aim, as they could not satisfy Hippocrates. He used his *eustochia* to arrive at a synthetic prognosis, and men like Oppolzer or Leyden used theirs to arrive at a synthetic diagnosis, but use it they all did, although the latter allowed the reasoned processes to go on unperturbed. Well they knew, for they were great physicians, that a detailed view of disease alone will never enable anyone to understand medicine.

But, as said, not the method but the aim of all this feverish activity has to be envisaged. In doing this modern medicine, particularly modern internal medicine, appears again to be, and deliberately claims to be, a science; wandering on the same path which the Cnidians trod twenty-four hundred years ago and which the medieval Galenists boasted to use. Very well, if it only be remembered that the methods of science are but tools, weapons in a fight: in a fight for life and well-being of those committed to our care; and that they should not be allowed to sidetrack medicine, that science is not an end in itself. What happened in the last century and still happens is essentially the same process which marked the efforts of the Graeco-Roman schools. The Pneumatists meant to detect the physical force of air at work in the production of disease. Similarly, we detect physical and physico-chemical forces, osmosis, filtration, diffusion, in the production of renal pathology. Their air, or their *pyr technikon*, causes at times faulty mixing of humors, resulting in sickness; and this might easily be paralleled by oxygen, disturbances of the hemoglobin dissociation curve and cyanosis. The Methodists drew upon the ideology of mechanics to explain what they called states of tension, caused by closeness of the atoms, as in convulsions; we call upon the jargon of general biology in talking about "increased irritability." Fundamentally, the attitude is the same: to obtain intellectual satisfaction, to see in the patient not an entity, but a temporary arena in which the manifestation of natural forces may be serenely watched. Naturally, every age operates with a varying amount of data and ours happens to be much richer in them than, *e.g.* the centuries after Alexandria, but who would fail to observe the sameness of the process?

It is obvious that such an attitude does not conform any more to our ancient concept of the physician's work, although at every time, as we have seen, arose men consciously reverting to the Hippocratic task. The great problem is: Can such a reversion be expected in others than men of genius, and can this original task, this safe and somewhat symbolic reversion be reconciled with a parallel scientific attitude? The first would more or less be contained in the second question, and my answer to that one is that exactly this will be the mission of the twentieth century.

What will become of this enormous bulk of knowledge pertaining to more or less severed mechanisms, this *rudis indigestaque moles*, this crude and undigested mass? The burning need of a new synthesis, outstanding since Paracelsus, to set down our knowledge pertaining to the reactions of the sick individual and not the behavior of sick *organs* has produced abortive attempts like Brugsch's General Prognostics[26] or Kraus's Syzygiologie.[27] These attempts culminate in the monumental work just launched by Dr. Brugsch which will serve the purposes of a clinical anthropology.[28] In the introduction to his work, the author (or rather editor) states: "Immer offenbarer wurde die Erkenntnis, daſs wir zwar viel von Krankheiten wissen, viel weniger dagegen vom Kranken." Everything that has been hitherto considered intangible will be considered from the standpoint of prognostics and therapy: heredity, race, duration of life, characterology and various outward expressions of the personal entity, such as habits and form, writing etc. The vexed problem of constitution, with which Erasistratus labored and which called out every physician with a synthetic mind, including Sydenham, shall possibly find a workable formulation. This is a serious endeavor to study man to ultimately improve his equipment wherewith to fight disease and to adapt himself to the complex conditions of life in society. Hitherto the reactions of his organs have been studied; now is the time to study the reactions of himself.[29] The implications of such a study are great both in preventive and in therapeutic medicine, for it will render possible a wise control of nutrition, of work, of endocrine functions, it will shape an intellectual orientation. Similarly, every serious effort to investigate mental life will be conducive to a medical reorientation. An effort to solve the psycho-physical riddle is not a necessary premise for *practical* attempts to regard man as a spiritual being; and the new psychiatry did much to advance the original therapeutic idea and to enable the physician to regard his patient as a whole.

To attain to a sublime medical attitude, loyal to our "true, original course," it seems to me that first of all two philosophic convictions are essential. The first is epistemological and humbly acknowledges that some problems *are* futile, that there is much value in DuBois-Reymond's *ignorabimus* and accordingly time should not be wasted on them. It remains to everybody, to detect one by one the vain lure in some phases of "scientific" endeavor and believing in "doubt, chance and mutability" honestly display some scepticism, doing away with the insane boastfulness of the nineteenth century, which differed not in the least from the rationalistic boastfulness of the Middle Ages.

> For nothing worthy proving can be proven
> Nor yet disproven: wherefore thou be wise,
> Cleave ever to the sunnier side of doubt.

And the "sunnier side of doubt" is the one where our therapeutic medical task lies. The second philosophic conviction is deontological and akin to the first: it is the deliberate acceptance of help and healing as our duty and *not* the gathering of knowledge for its own sake. This is the *choix de sagesse* and should well compensate for the loss of deceptive scientific pride that it implies.

In the rays of this *Erkenntnis* medicine should assimilate the duties involved in its true function. Amidst all activities research for improved methods of diagnosis or for a better knowledge of underlying pathological processes, the physician must preserve, clear-eyed, the pragmatic thought and emotional purity with which he started out on his pathetically uneven road. Then he will consciously arrive at the point of departure, immensely richer but with the same outlook, to wit, wishing to give man that which is dearest to him, life. For human beings, when unfortunate, are the same today as in the paleolithic and implore their fellows' help through the same primitive emotions:

> Then every man, of every clime
> That prays in his distress,
> Prays to the human form divine,
> Love, Mercy, Pity, Peace.

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# HISTORICAL FACTS IN DIABETES

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## BABYLONIA AND EGYPT

SCIENCE began when man, without even understanding its meaning, discovered the fact that the great cosmos is governed by order. It began, when man learned that given certain fixed conditions, certain consequences invariably follow. Order is the first law of the universe. Gleaning the pages of early history, it is apparent that before man grasped the meaning of this first law, fear, mystery and superstition dominated his entire life.

In the cradle of our Western civilization, in the valleys of the Nile and the Euphrates, man, emerging out of the darkness of an unknown and illiterate past, craving self-expression, made records of his ideas and ideals. The Sumerians, having a fine clay in their soil, patted it into tiles and pots, which they inscribed with cuneiform writing and afterward baked in the sun. Such earthenware tiles and pottery are the books out of which we now study the remote past. The Egyptians, living along the banks of the Nile, had no fine or plastic clay like that of the Sumerians. They therefore resorted to strips of Papyrus reed fastened together, which were shaped into rolls and inscribed. These records, buried in the sands of time have been unearthed for us by diligent Egyptologists, and they have thrown much light on Egyptian civilization.

The most interesting of these for our purpose, is the Papyrus Ebers, written about 1500 B.C., which records medical knowledge of ancient days. Commenting on a study of the Papyrus Ebers, Hurry remarks:

> Considerable progress had been made especially in clinical examination, diagnosis and therapeutics. There was an accurate knowledge of the skeleton and of the method of treating fractures successfully. The position and function of the stomach and intestines were known, as well as the fact that the great blood vessels run from the heart to every part of the body . . . The widespread influence of a disordered cardiac action is recognized, the heart being described as the beginning of all the members. The relation of the pulse to the heart was well recognized. Evidently the physicians who practiced on the rule possessed in some measure by the scientific spirit, were capable of accurate clinical observation and competent to coordinate and interpret symptoms . . . Remedies were classified in special groups, among which were sedatives, narcotics, hypnotics, purgatives, emetics, etc.

And yet alongside this evidence of a definite beginning in medical science, there are as previously suggested, evidences indicating vast ignorance, great fears and superstition.

It should be recalled that in those early days, the priests were practically the only ones who could write, and that their temples were repositories of the community records. Here the days were counted and calendars maintained. Aside from the function of keeping time, the priests became leaders and faithful servants of the public, and they no doubt enjoyed the respect and affection of their people. It is easy to see that a set of thoughtful or wise men in that position, would soon become advisers in matters pertaining to health. As a child in moments of stress runs to its mother, so the sick came to the priest for advice. Thus may we imagine, temples of health came into existence.

In Heliopolis, the Egyptian "City of the Sun," there were temples which served as centers of medical activity. It is not altogether clear, whether in those temples more emphasis was laid on worship or treatment of disease; whether certain temples were devoted entirely to healing of the sick, or whether the art of healing was incidental, since those who ministered there, were both physician and priest. It is worthy of note, that nowhere in the Old Testament is it mentioned that a priest acted in the capacity of physician. Some idea of the activities, beliefs and practices of the priest-physicians of the early days may be had from the historical writings of Brown, who gives an interesting account of Babylonian priests of four thousand years ago.

> The priests in the Temple of Babylonia were little more than magicians and medicine men. The priesthood owned magnificent and costly brick temples, that rose to the very heavens in ornate terraces. These temples housed idols to which sacrifices were made. There were many divisions in the priesthood, each with its own particular function. Certain of the clerics awoke the gods in the morning, washed and dressed them and offered elaborate sacrifices; others sang the hymns and chanted the spells; others read horoscopes and told fortunes; still others were assigned to the task of fructifying barren women who visited in the temple courts. In Babylonia, a woman had to wait in the courts of Ishtar until some man bought her for an hour. Without performing that rite, a woman was imagined to be incapable of bearing children and was therefore unfit to marry. As a result of this, says the historian, the temple courts were simply choked with desperate virgins. The priests were often paid to play the part of the welcome stranger.

Contemplating the past, sets one to visualizing the distant future. Let us imagine an inundation covering one of our modern medical office buildings, and the speculations arousing the archaeologist at the time of its excavation, two or three thousand years hence. Will some future historian cogitating over our day, say that magnificent temples with pillars of marble and doors of bronze, towering to the skies, were built for the physician of the twentieth century? Will he say that physicians of our day, because of our special interests and motives, were men more or less set apart from the rest of society, titled by institutions of learning and endorsed by the political government of the day; will he presume that we of our day, were highly privileged and so trusted as to be held answerable only to our own conscience; that our activities with the rarest exceptions were unquestioned, and that we were unmolested in our social and humanitarian efforts? Will he say, that our code of ethics and our adherence to this code was so far above the *mores* of our day, that society held us in high regard? And will he say, that the sick coming to these towers from all directions, brought offerings of gold, more so to those skilled in the use of the knife? Will he also say that some of the physicians amassed fortunes greater than that of Croesus, and even built temples dedicated to the memory of their own names or the cities in which they lived, these being known as clinics? What fine material for speculation the historian of the future will have, when his fancy carries him back to this heyday of American medicine!

Herodotus (484–425 B.C.) the Greek historian, one of the greatest travellers of his time, writing of early Egyptian days, said, "Each physician applies himself to one disease only and not more. All places abound in physicians. Some for the eyes, others for the head, others for the teeth, others for the intestines and others for internal disorders." If that is an actual picture of those times, we may readily imagine that in the dawn of medical history even as in this very day, there were physicians specializing more or less in the treatment of diabetes.

Diodorus says:

> The Egyptians boasted that they were the healthiest of all mortals. They probably knew that the majority of diseases proceed from indigestion and excess of eating, and these evils they avoided or combated by frequent days of abstinence, by emetics, gentle aperients and other means of relieving the system. The whole manner of life, was so evenly ordered that it would appear as though it has been arranged according to the rules of health by a learned physician, rather than by a law giver.

This most interesting shaft of light upon the Egyptians and their times, throws a sudden illumination on the origin of Mosaic laws, which have caused so much wonderment in the more recent past. In the light of this knowledge, we can more readily understand how it was, that hygiene became so integrated into the religion of the Jews.

The history of diabetes actually begins with the Papyrus Ebers, which has already been mentioned. Therein is described an abnormal polyuria, now believed to have been diabetes.

### EARLY GREEK

Hippocrates of Cos (460–377 B.C.) the son of a priest physician, is credited with having separated medicine from the activities of the priest, and therefore, from magic and religion. Celsus said of him, that he separated medicine from philosophy, meaning thereby, from the philosophy of Pythagoras and Plato. In fact, Hippocrates was the first physician who reflected any intellectual power at all upon medical art, which up to that time, was the combination of a few facts with many fancies. After an active and fruitful career, Hippocrates ended his days in Thessaly, dying in Larissa at an advanced age. According to tradition, a swarm of bees settled on his tomb, the honey of which was said to be efficacious against stomatitis in children. I quote this because of a personal experience only a few years ago, which I did not understand at the time. A mother, applying honey to the mouth of her child with ulcerative stomatitis, assured me that she heard it was an excellent remedy for the condition. What a long life some superstitions seem to enjoy!

Hippocrates studied human disease from the objective viewpoint; recording case histories and observing the patient's symptoms as no one had ever done before. It seems however, that he did not distinguish diabetes; in his writings there is no clearly defined description of this disease.

### ROME

Aulus Cornelius Celsus (30 B.C.–50 A.D.) eighteen hundred and seventy-five years ago, wrote treatises on medicine as well as on agriculture and other subjects. Greek Medicine reached Rome before the Christian Era. Celsus, a Roman, translated the Greek medicine of his day, writing an admirable summary of medicine and surgery of the Hippocratic and Alexandrian periods. It appears that while Celsus was not a practicing physician, he was nevertheless, a learned and highly versatile gentleman. He introduced or popularized the use of mercury, opium and antimony. He left a good description of diabetes, claiming however, that patients thus afflicted have a discharge of urine greater than the amount of fluid taken by mouth. While the interpretation of this statement might be a topic for controversy now, it appears to have been accepted at face value for eighteen hundred years. Is it not strange that this claim should have remained unquestioned throughout the period of Hellenic culture, the beginning of the scientific era, in which the purely objective viewpoint was always sought?

### GREECE

Aretaeus of Cappadocia (30 A.D.–90 A.D.) gave the same definition of diabetes as Celsus. In fact it was he, who constructed the word dia-betes, which means to pass through. History says of Aretaeus that he was a great clinician, and easily ranks next to Hippocrates. In the Dialogues of Plato, are found the reflections and influences of Pythagorean philosophy, which had its effect on medical practice. In Timaeus one reads, "He who instead of accepting his destiny endeavours to prolong life by medicine is likely to multiply and magnify his diseases: regimen and not medicine is the true cure when a man has time at his disposal," "No attempt should be made to cure a thoroughly diseased system, and so to afford a long and miserable life to the man himself as as well to his descendants. For Esculapius did not think a man ought to be cured who could not live in the ordinary course, as in this case he would be of no service to himself or the state." In the light of such a viewpoint, it is understood why Hippocrates, living in the atmosphere of Pythagorean philosophy, refrained from treating patients with incurable diseases.

While Aretaeus was true to the medical teachings of Hippocrates, it is apparent that he deviated from his master in the acceptance of the philosophy of Pythagoras. Aretaeus, known for his dignity and love of the art of medicine, was either a very sympathetic or a very wise man. He believed that one should prolong life by medicines when possible, that it was the physician's duty to treat incurable as well as curable diseases, and that the physician should attend incurable cases, even though he could do no more than express sympathy. In this Aretaeus the pupil transcended Hippocrates the master. It seems reasonable to suppose that this attitude of Aretaeus, coming when it did, about 50 A.D., was due directly to Christian influence.

Aretaeus described the principal symptoms of diabetes and called attention to its association at times with acute infectious diseases, but he said nothing of the presence of sugar in the urine. The following is a careful translation of Aretaeus, "Of the Causes and Signs of Acute and Chronic Diseases:"

> Diabetes is a wasting of the flesh and limbs into urine from a cause similar to dropsy. The patient never ceasing to make water and the discharge is as incessant as a sluice let off. The patient does not survive long for the marasmus is rapid and death speedy. The thirst is ungovernable, the copious potations are more than equalled by the profuse urinary discharge, for more urine flows away . . . How indeed could the making of water be stopped, or what sense of modesty is paramount to pain? . . . The epithet diabetes has been assigned from the disorder being something like passing of water by a syphon . . . The disease is caused by some of the acute diseases. It is suspected that the pernicious influences of those diseases which attack the bladder and kidneys contain in themselves the cause of this disorder.

Aretaeus mistakenly gave as one of the causes of the disease, the bite of a reptile, the Dipsas. "This bite causes an ulcer which in turn is followed by diabetes." Aretaeus also left good descriptions of pneumonia, diphtheria and tetanus, and certainly showed great clinical insight when he segregated cerebral from spinal diseases.

Galen (131–201 A.D.) a great intellect of his day and a reorganizer of medical philosophy and the medical profession as well, was the founder of experimental medicine. Galen described diabetes as "a weakness of the kidneys which cannot hold back water," and the urine of diabetes as unchanged drink. This and other Galenic theories were accepted without question for centuries.

### INDIA, CHINA AND JAPAN

Hindu medical writings of the sixth century refer to this disease as Madhumeha, honey urine:

> It is a disease of the rich and one that is brought about by gluttonous overindulgence in rice, flour and sugar. This order of disease is ushered in by the appearance of morbid secretions about the teeth, ears, nose and eyes. The hands and feet are very hot and burning, and the surface of the skin is shining as if oil had been applied to it. This is accompanied by thirst, and a sweet taste in the mouth. The different varieties of this disease are distinguished from each other by the symptoms of deranged humors, and by the colour of the urine.
>
> If the disease is produced by phlegm, insects approach the urine, the person is languid, his body becomes fat, and there is a discharge of mucus from the nose and mouth, with dyspeptic symptoms and looseness of the skin. He is always sleepy, with cough, and difficult breathing.
>
> 1. In this disease the urine is nearly of the natural colour, without any sediment. It is white, very cold, has no smell, and is like water. 2. The urine is like the juice of sugar-cane in colour and taste. 3. In this variety, the urine becomes thick after standing some time. 4. When the urine is of a white colour, it is thin

and pure above, and thick below. 5. At the time of micturition, the hair over the body is erect, and the urine has a copious white powder, as if flour had been mixed with it. 6. In this variety the urine is the colour of semen, which sometimes appears mixed with it. In the chronic form this is incurable. 7. When the urine lets fall a hard and small deposit like sand. 8. When there is a copious secretion of urine which is sweet and cold. 9. When there are frequent calls to make urine, which is discharged in small quantities. 10. When the urine is like mucilage, and has long strings of adhesive fibrous matter mixed with it, it is cured by means of astringent decoctions.

This is the diabetes mellitus, which was known to the Hindus, and its danger appreciated, before it was known in Europe. All the hereditary and congenital forms of this disease are incurable; and if not properly treated, they generally terminate in sweet urine, which is incurable.

Among the Chinese and Japanese, while their oldest epitome of medicine was compiled in the time of Honang-ty in 2637 B.C., the first attempt at scientific medicine, if it may be dignified by that name, is recorded by Chang-ke about 229 A.D. The Chinese and Japanese, seventeen hundred twenty-five years ago, wrote that the urine of diabetics was very large in amount and was so sweet, that it attracted dogs, and in the description of this disease, they noted the occurrence of furunculosis.

In perusing the literature of what we now call medicine of the ancients, we occasionally meet with sketches that illuminate the past. The following is a description of the Chinese doctor and his times a thousand or more years ago:

> One of the better class of practitioners in cities visits his patients in a sedan chair, at a fixed hour before breakfast. The chief person of the house receives him. Tea and a pipe are first offered, and he is then requested to examine the pulse of the sick person. When this has been done, he asks a few questions, and having got an insight into the complaint, explains the nature and the result of the disease, prescribes the necessary medicines, and receives his fee wrapped up in red paper, which is called the "golden thanks." It varies in value from two shillings and sixpence, to five or six shillings, according to the reputation of the practitioner, and the means of the patient; the chair-bearers also receive a present. The practitioner does not pay another visit till invited, as they have little faith in the professions of the practitioner, unless evident benefit is derived from the medicine. Another and another practitioner is often called in, until relief is obtained; and in severe diseases, the Chinese, when dissatisfied with medicine, have recourse to a genus, or a god called Jopuongcho-Said, a distinguished physician, celebrated for his healing powers, who was deified after death.

### ARABIA

Rhazes (860–932) an Arabian physician, commented on the treatment of diabetes.

Avicenna (980–1027) prince of physicians, was the great Arab physician of his day. He is said to have written over 100 works on different subjects. His "Canon" was an attempt to codify the whole of medical knowledge, much as the modern systems or encyclopedias of medicine today. Seen in proper perspective, Avicenna undoubtedly was a clinical genius, and a great medical writer. He claimed that diabetes may be primary or secondary to another disease. In this he follows the teachings of Aretaeus. He observed that diabetic patients have irregular appetite, suffer great thirst, nervous exhaustion, an inability to work, and loss of sex function. Avicenna believed that in diabetes the liver is affected. It may be that he noted some cases with enlarged livers, which we now recognize as bronzed diabetes. "The kidneys," he wrote, "attract humors from the liver in greater quantities than they are able to retain. The urine leaves a residue like honey." He observed that carbuncles and phthisis are frequent complications. He described diabetic gangrene, and finally, it was his opinion that treatment was not effective. One may well ask what are the essential clinical features of the disease, as we know it today, that Avicenna left undescribed?

### Europe

Other observations on diabetes were recorded by Italian, Portugese, Greek and Dutch physicians, but it seems that no definite advances were made until the time which the historian designates as the Second or Diagnostic Period.

Sylvanus (1478–1555) believed that diabetes was a disease of the blood.

Aureolus Phillipus Theophrastus Paracelsus Bombast von Hohenheim (1493–1541), denied the four humors of the old pathology, which dated back to the time of Hippocrates of Cos. He asserted bombastically that these humors do not exist and he tried to discredit many of the prevailing medical ideas of the day.

Paracelsus was learned in chemistry, particularly in metallurgy, which he would have made the servant of medicine had he the power to do so. He evaporated a liter of diabetic urine and recovered 4 ounces of "salt," which he said makes the kidney thirsty and causes polyuria.

Judging the historical sketches of this extraordinary man, we may say complacently that his life and those of his colleagues about him, was full of human interest. He is described as insolent, inflated and bellicose. All of this was said of him for publicly burning the works of Galen at Basle. He outraged the finer senses of his colleagues by lecturing in the German language instead of Latin, and no doubt they were his very good medical friends who called him, the greatest charlatan and mountebank that ever acquired celebrity. But such venom was not for Paracelsus alone. Sweet tongued Hippocrates likens physicians to actors, saying "so also are physicians, many in title and few in reality." He regrets that there is no punishment for physicians except disgrace. History also records that there was vituperation in plenty against Galen in his day and that he in turn, expressed a like contempt toward all those who opposed him.

To return to Paracelsus, let us say of him, that having lived by the sword, he died by the sword. For the pains he took with his colleagues, it appears that one of them, during a heated argument, threw him out of a window; the injuries caused his death. Thus ended Paracelsus.

Cardano (1505–1576) not accepting the dictum of greater output than fluid intake, compiled a table in which he recorded the intake of liquid and urinary output in diabetic patients.

Willis (1621–1675) of Oxford University, claimed diabetes to be primarily a disease of the blood, and that the sugar which first appears in the blood, later appears in the urine. He made the best qualitative urinalysis possible in his time, noted sweetness of the diabetic urine, and differentiated diabetes mellitus from diabetes insipidus. Pavy, in the Croonian lectures, claimed that Willis was first to comment upon the sweet character of the urine in diabetes, but this is incorrect in the light of Hindu, Japanese, Chinese and Arabian descriptions of the disease.

Brunner in 1682, discovered that removal of the pancreas produces polyuria and polydipsia, in the experimental animal. But it appears, that he did not realize that the pancreas had a digestive function, and that he did not appreciate the significance of the polyuria and polydipsia he described.

Robert Wyatt in 1774, claimed that in diabetes there is a sugar-like substance in both the blood and urine. He recovered this substance from the urine by evaporation.

Dobson in 1776 demonstrated that diabetic blood is sweet and diabetic urine contains sugar which ferments.

Frank Johann Peter (1745–1821) defined diabetes insipidus as diabetes without glycosuria.

Cawley in 1788, for the first time, diagnosed diabetes by demonstrating the presence of sugar in urine. He also observed that the disease may result from injury to the pancreas, such as occurred in a case of diabetes in which he found a pancreatic calculus, post mortem.

Rollo in 1796, an Englishman, should be

credited with having laid the foundation for systematic treatment of diabetes by restricted dieting. This was the beginning of the Period of Empiric treatment. Rollo was the first to show that diabetic urine with a mineral acid produced oxalic acid, and diabetic blood when treated with nitric acid, yielded more oxalic acid than normal blood. He described a patient of twenty-five years, with the odor of decaying apples on his breath. Rollo also denied the old claim that in diabetes, urinary output is greater than fluid intake.

Latham in 1811, further differentiated diabetes mellitus from diabetes insipidus, which had already been done by Willis (1621–1675) and by Ettmüller in 1683.

Chevreul (1815) identified the sugar of diabetes as grape sugar.

Eberle in 1831, observed that "the diabetic urine enters very slowly into putrefactive decomposition but passes readily into acetous or vinous fermentation."

Then came Bouchardat (1806–1886) with whom the modern viewpoint of diabetes begins. We may really say that in the last sixty years, more has been learned of diabetes than in the preceding eighteen hundred and fifty years. Evaluating Bouchardat's work in diabetes, we must admit that it was remarkable. Bouchardat used the fermentation test, the polariscope and copper solutions for detection of sugar. In the treatment of diabetes, he advised the use of fresh fats as a substitute for carbohydrate, the avoidance of milk because of its lactose, and the use of alcohol as a food. He invented gluten bread, stressed the advantages of using green vegetables, instituted fast days, and emphasized the importance of undernutrition. He prescribed exercise for the diabetic patient and administered alkalies. He called attention to the fact that during the siege of Paris, when food was scarce, glycosuria disappeared in diabetic patients, just as it did in Germany eighty-five years later, during the World War.

From the time of Avicenna to Bouchardat is some eight hundred years. The former gave us the best descripton of the disease to his day, and the latter laid down the most rational treatment up to his time. Both description and treatment were empiric, but they marked great advances over preceding periods.

Von Stosch in 1828, propounded the neurogenic theory of diabetes, claiming that the disease was of cerebral origin.

Addison and Sir William Gull (1851) described xanthoma diabeticum. Herman Von Fehling developed the well known test for sugar in 1848. Brucke and Bence Jones (1875) demonstrated the existence of small amounts of sugar in the urine of normal persons. This was verified by Pavy and described in the Croonian Lectures (1878).

Claude Bernard (1878), famous for his experimental puncture of the floor of the fourth ventricle with resulting glycosuria, showed that in diabetes there is primarily an excess of sugar in the blood, and after that, in the urine. In this he was anticipated by Wyatt and by Dobson. Bernard demonstrated sugar in blood taken from the right heart. He was the first to study glycogenic function of the liver, and after isolating glycogen he said that it was the "internal secretion of the liver." As early as 1856, he made important studies of the pancreatic juice pertaining to emulsification of fats, their passage through the intestines, and its power of converting starch into sugar. Even in that day, he made accurate blood sugar estimations.

Ambrosiani in 1835, proved the presence of a fermentable sugar in the blood.

Pavy (1829–1911) devoted twenty years of hard work to the study of this disease. After making simultaneous blood and urinary sugar estimations, he came to the conclusion that there is a definite relationship between the degree of hyperglycemia and glycosuria. This was later verified by Von Noorden. Pavy believed that sugar is not made and ordinarily is not stored in the liver. He originated the well known Pavy's solution for quantitative sugar analysis.

Pavy insisted that by dietetic management alone, the urine will become sugar free and health restored, even though sugar might return at some future time. Diabetes, he said, is a progressive disease, the underlying pathologic condition making gradual advancement. He compared the course of the disease to that of locomotor ataxia, insomuch as there are quiet periods alternating with periods of progress, and believed that by strict dieting the life of the patient would ultimately be prolonged.

Trousseau was first to distinguish bronzed diabetes. His description reads: "There was almost bronzed appearance of the countenance and blackish color of the penis. Autopsy showed a cirrhotic liver twice the normal size."

Von Noorden believed that both the liver and thyroid gland played an important role. He made many observations on the metabolism in the disease, anticipating many present day workers in the metabolism of diabetes.

Naunyn devoted almost his whole life to the study of metabolism in diabetes, diseases of the liver and pancreas. He believed that regardless of the pathologic or metabolic changes in the individual patient, hereditary tendency to the disease, the "diabetic anlage," is a most important factor and was demonstrable in 30 per cent of his cases. Naunyn accounted for three forms of the disease; diabetes of the young, of the aged, and organic diabetes; this group including those cases associated with diseases of the pancreas, liver, thyroid, and diseases of the nervous system. "Diseases of the pancreas," he said, "have only in rare instances been determined with certainty as the cause of diabetes. These affections are pancreatic calculi, pancreatic cirrhosis, neoplasms and cysts."

*Metabolism.* Before entering upon a discussion of metabolism in its relation to diabetes, let us recall the names of those who paved the way. Galen, Servetus, Columbo, Cesalpinus, Sarpi and best known of all, Harvey, the great crystallizer of all knowledge pertaining to (if in reality not the actual discoverer), the circulation of the blood. Hemmeter credits discovery of the lesser circulation to Servetus in 1546, and discovery of the greater circulation to Cesalpinus in 1569. Harvey's description came in 1628, and although Harvey is generally conceded by the English speaking world, to be the discoverer of the circulation of the blood, it is said that he was sorely perplexed because he could not understand the purpose in the blood's rapid flow throughout the body. Two hundred years elapsed between the time of Harvey and that of Priestley and Lavoisier. Priestly discovered oxygen and Lavoisier made the first "basal metabolism" estimation. Lavoisier discovered that metabolism was increased by food, work and cold. When we realize that a knowledge of metabolism is the first essential in the true understanding of diabetes, the importance of the place which Lavoisier holds in the history of this disease, is clearly defined. One is saddened at the thought of how little the world about him appreciated the importance of Lavoisier's efforts. Says Lusk, "To the darkness of the history of the time, (the days of the French Revolution) belongs the fact that Lavoisier, begging for only two weeks more of life, in order to complete some experiments, was denied those fourteen days and was guillotined, thereby becoming the greatest sacrifice of the insensate fury of his age."

Priestley (1733–1804) simultaneously with Scheele, discovered oxygen in 1774. Placing red lead (minium) in a closed glass vessel and concentrating the sun's rays by means of a lens to produce sufficient heat, Priestley found that a new "air" was liberated. He noted that this air (oxygen) intensified the flame of a candle, and that mice did not suffocate, but lived well in its presence.

Lavoisier (1743–1794) proved that oxygen and not nitrogen, is essential for respiration; and that animal respiration is a process of oxidation. He obtained correct values for oxygen consumption of man. He showed that when plants burned, $CO_2$ and $H_2O$ resulted. "Animal and man like a burning piece of wood, absorbs oxygen and eliminates $CO_2$." Lavoisier actually laid the foundation of present day physiological chemistry.

The early work of Pettenkofer and Voit, Lehman, Ebstein, Leo, Magnus-Levy, Kaufman, Von Noorden and many others, all indicate that caloric need of the diabetic is equal to that of normal man. If there is an abnormal deviation at all, it is on the side of a greater than normal basal metabolism. Ordinarily, oxygen absorption, carbon dioxide elimination, and heat production are normal or above normal in the diabetic.

Hirshfield in 1895, showed that the absence of carbohydrate from metabolism is the causative factor in acidosis.

Petter in 1875, discovered acetone in diabetic urine.

Kaulich distilled 700 pounds of diabetic urine and purified enough acetone to identify it by elementary analysis.

Kussmaul discovered acetonemia in 1874.

Stadelmann in 1833, a pupil of Naunyn, discovered B-oxybutyric acid and recognized that diabetic coma was the result of the increased formation and accumulation of acids.

Minkowski elaborated upon the work of Stadelmann and further demonstrated the presence of B-oxybutyric acid and its relationship to diabetic coma.

Kraus, Naunyn, Magnus-Levy, Lepine, Saundby, Williamson, Von Mering, Von Noorden and many others have studied the disturbed metabolism of diabetes and given us most of the knowledge we now possess. In fact, it is interesting to note that some unsettled questions of the early days of Naunyn, Magnus-Levy and Von Noorden, are still unsettled questions today.

*Acidosis.* Naunyn first employed the term acidosis to designate abnormal accumulation of acids in the body. Although formation of acids goes on in normal health as a physiological process, certain metabolic disturbances produce abnormal acids, such as uric, oxalic, homogentisic, and most important to us here, oxybutyric acid. Oxybutyric acid undergoes oxidation into diacetic acid, from which acetone is formed.

Naunyn says:

> By diabetic acidosis, I mean the formation of B-oxybutyric acid in the processes of metabolism. Acetonuria and diaceturia are part of acidosis; for both substances originate from oxybutyric acid. I know that certain prominent chemists have maintained the opposite view, that acetone and diacetic are not formed from oxybutyric acid, but I also know that very prominent chemists may be mistaken in their reports. For in the very cases in which they found no oxybutyric acid, and in the specimens which they kindly sent to me for examination in my laboratory, I succeeded in demonstrating oxybutyric acid in the urine.

Today another view prevails. Says Shaffer:

> The first formed of the acetone bodies is very probably aceto-acetic acid, which if it accumulates in the body, is in part decomposed into acetone and $CO_2$ and in part reduced to hydroxy butyric acid.

Says Magnus-Levy:

> Acetone bodies are eliminated always when carbohydrates are lacking in the organism or when they are not utilized in a normal way. Under these conditions, indeed, the oxidation of protein and fat will be deficient and oxybutyric acid will appear in the urine. Acidosis, and I repeat it again and again does not only, or perhaps not at all depend upon the formation of acids, but also and perhaps exclusively upon their combustion.

Sugar is the most combustible product consumed in the organism. When sugar is not oxidized, total combustion is lessened, and those other substances which should be oxidized simultaneously, accumulate unburned. Thus, said Rosenfeld, "Fats burn in the flame of carbohydrates." Von Noorden considers acetone a by-product of protein. The greater part of the acetone bodies however, have fatty acids as their immediate precursors. Carbohydrate combustion is the "primary oxidation." Protein and fat combustion is the "secondary oxidation." Magnus-Levy does not admit Von Noorden's distinction between primary and secondary oxidation, and believes that total oxidation is but a single process.

Beginning with Priestley and Lavoisier, who laid the foundation for the study of metabolism, and the work of Petter, who discovered acetone; Stadelmann, who discovered B-oxybutyric acid; Naunyn, Magnus-Levy and Von Noorden, whose laboratory and clinical research firmly established most of our present day ideas, we have at last arrived at a relatively satisfactory working knowledge of this disease.

### THERAPEUTIC STUDIES

As biochemical disturbances came to be understood, treatment of the disease was gradually established on a better basis. Discovery of acidosis brought forth alkali therapy. While today this is looked upon as a mixed blessing, it no doubt was a necessary step in the evolution of a more complete knowledge of the disease.

Fats and fatty acids associated with improper oxidation, led to restriction of these substances in the diet. Proteins, another source of ketones, were also restricted, and the necessity for carbohydrate restriction was long known.

No one perhaps, has stated more clearly than Naunyn, writing twenty-five years ago, the principles which are applicable today in the dietetic treatment of the disease. He advises first of all, prophylactic treatment, particularly dietetic, in those who have an hereditary predisposition, and further advocates the following:

1. The Alpha and Omega in the care of diabetes is dietetic treatment, and not drugs.
2. It must be known that diabetic glycosuria increases with time while the tolerance of the patient decreases.
3. When the diabetic is free from sugar, his tolerance usually increases. Therefore aim to render the patient sugar free and keep him aglycosuric.
4. Limitation of the total diet with resulting disencumbrance of the entire metabolism brings about a favorable result.
5. Reduction of carbohydrates and of proteins for the removal of glycosuria.
6. Sugar producing foods are the carbohydrates and proteins.
7. We should determine the exact qualitative and quantitative diet for every diabetic who comes under treatment.
8. Patients get along well on 30–35 calories per kilo body weight.
9. Sugar production from fat does not play such an important role as to influence diabetic glycosuria to any notable extent.
10. For this reason and on account of its high caloric value, fat is the most valuable food substance for the diabetic.

Let me ask the physician, abreast of modern ideas in the pathology and treatment of diabetes, how much do our present day views of this disease, carry us, beyond this decalogue of diabetic science? At this point let me link the names of Avicenna, Bouchardat and Naunyn, as great teachers. Their descriptions of the disease and the treatments they recommended, stand out boldly in the history of diabetes.

Von Noorden in 1895, advocated the oatmeal diet. The benefits obtained were due mostly to the fact that the total caloric value and the protein content of the diet were low.

Guelpa of Paris in 1896, began the treatment of diabetes with periodical fasting. This was advised as a measure to "disintoxicate" the diabetic patient. It should be recalled here, that Bouchardat half a century before, advised fast days in the treatment of diabetes. Guelpa demonstrated that by fasting and the use of saline laxatives, the patient is made sugar free usually in three days. In 1910, he presented his results before the British Medical Association. Working with Robin at the Beaujon Hospital in Paris, he had demonstrated the effects of fasting in severe cases of diabetes, finally winning the approval of the most skeptic ones about him. Said Bardet, "Guelpa has done something both new and of great significance." Fasting was less quickly adopted in America, because at this time, Benedict, Mendel and others were claiming that fasting would increase ketosis, thus inviting diabetic coma, and therefore, it was dangerous.

An American, Woodyat in 1909, wrote of semi-starvation for periods of one to five days in the treatment of diabetes. Allen and Joslin further developed the fasting treatment.

Allen in 1913, as well as at the present time, holds the view that diabetes is a disease of the total metabolism and not of the carbohydrate metabolism alone.

### LANGERHANS TO BANTING

Langerhans in 1869, described the islets in pancreatic tissue which are now known by his name, the Islands of Langerhans. Cantani held the view that atrophic changes in the pancreas were produced by diabetes, and that they were not to be considered as the cause of the disease.

Lanceraux and Lapierre, Paris, (1877) claimed that there is atrophy of the pancreas in diabetes.

Mering and Minkowski in Germany, showed that pancreatectomy caused hyperglycemia, glycosuria and finally, death.

Vassale in 1889, ligated the duct of Wirsung, noted that atrophy of the acinous tissue in the pancreas followed, that no changes occurred in the Islands of Langerhans, and that glycosuria was not produced. Therefore, he argued, the function of the Islands of Langerhans was apart from that of the acinous tissue.

Lepine in 1892, believed that in diabetes, the pancreas fails to produce the required ferment or internal secretion necessary for health. Williamson in 1894 suggested implantation of living pancreas. Sandby in 1894, suggested that a fresh extract of pancreas be injected, thereby hoping to replace the needed pancreatic ferment. Sir E. Sharpley Schafer in 1895, suggested that pathological changes in the Islands of Langerhans may be responsible for diabetes.

In America, Opie in 1900, elaborated the idea that diabetes was a disease due to degeneration of the Islands of Langerhans in the pancreas, that these islands had an internal secretion, that alteration of form and function in these structures resulted in diabetes, and that the acini of the pancreas were not involved.

Zuelzer, Dohrn and Marxer (1906–1908) prepared an extract from expressed juice of the pancreas, treating it with alcohol and dissolving the residue in salt solution or water. They noted favorable effects of this extract on the hyperglycaemia of depancreatized dogs and also on the ketonuria of diabetes, and treated eight cases of human diabetes and four cases of ketosis with favorable results. The difficulty with their extract was its impurity, which after injection produced shivering, chills and fever. Says Macleod, in whose laboratory insulin was discovered by Banting, "There can be no doubt that Zuelzer in 1908 came very near to isolating what we now call, Insulin."

Ssobelow and Schulze working independently in 1902, found that after ligation of the excretory ducts of the pancreas, acinous tissue gradually undergoes atrophy, while the Islands of Langerhans remain intact. Their experiments also showed that withholding the external pancreatic secretion, pancreatic juice, from the intestine, did not produce glycosuria. He further proposed that if an extract of the Islands, obtained from the new born calf, could be isolated, such organotherapy might be effective in the treatment of diabetes.

Diamare and Kuliabko in 1904, claimed the presence of a glycolytic ferment in the isolated Islands of Langerhans of fishes. But, as Allen says, the claims were overthrown by Rennie and then withdrawn by Diamare. Lydia Dewitt in 1906 believed that atrophic pancreatic tissue, consisting largely of Islands of Langerhans, possessed marked activating power.

Massaglia, in Italy in 1912, experimentally proved that destruction of the acini of the pancreas does not cause glycosuria, but that destruction of the Islands of Langerhans does result in glycosuria. He also believed that an internal secretion of the pancreas governed carbohydrate metabolism, and attempted to treat diabetes with a pancreatic extract.

### AMERICA

The work of Opie in 1900 has already been discussed.

Allen in 1913, after surveying the entire field of diabetes and glycosuria in his remarkable monograph, defined diabetes mellitus as "the condition resulting from a reduction of the pancreatic amboceptor below the requirement of normal metabolism."

*Banting*. Moses Barron repeated the experimental work of Ssobolew and Schulze (1902) and obtained results similar to theirs. It now appears that this physiological experiment was the key which finally opened the way to the discovery of insulin. The hypothesis underlying the experimental research of Banting, was according to his own writings, formulated in November, 1920, after reading a report of Barron's work on the relation of the Islands of Langerhans to diabetes. Barron found that after ligating the excretory ducts of the pancreas, the acinous tissue gradually atrophies while the Islands of Langerhans remain intact. This being so, said Banting, an active extract of the tissue of the Islands of Langerhans, might therefore be prepared which should be an effective glycolytic agent. A subsidiary hypothesis was that trypsinogen, the secretion of the acini, and at the same time the external secretion of the pancreas, was antagonistic to the internal secretion of the pancreas. This he said, accounts for previous failures following the use of extracts of the whole gland.

Banting's work began in November, 1920, in the laboratory of Professor Macleod, University of Toronto, Canada. Assisting him were Best, a student in medicine, and Collip, a biochemist. By May, 1922, the importance and possibilities of his extract, Isletin, now known as Insulin, seemed very definite. After the injection of insulin subcutaneously or intravenously, blood sugar fell progressively from the normal to a low level, depending on the dose. After a primary fall, the blood sugar gradually returns to normal. If the dose is sufficiently large, blood sugar may fall to a level as low as 45 mg. per 100 c.c., at which time the animal develops certain alarming symptoms, the symptoms of hypoglycemia, also spoken of as insulin shock. These hypoglycemic manifestations disappear promptly upon the administration of glucose. Clinical application of the use of insulin was made by Campbell and Fletcher in the clinic of Graham, Toronto General Hospital. Thus it was that insulin came into existence.

Sir William Gull (1816–1890) one of England's great physicians, physician to Queen Victoria, is said to have been an extraordinary man. It was said of him that "he attracted numerous pupils and yet repelled many colleagues by his majesterial manner and imperious temper." To a certain extent, it may be imagined that he reflected the temper of his day, when by his intolerant reproach, he said of Pavy, who was devoting his whole life to the study of diabetes, "What sin has Pavy committed, or his fathers before him that he should be condemned to spend his life seeking a cure for an incurable disease?" In the light of what has happened since the time of Sir William, it now appears that if there is anything in the history of diabetes which ought to be a source of deep satisfaction to Banting, Best, Collip and Macleod, it should be this very quotation from Gull. "Insulin—Banting" is the answer to Sir William Gull. And this remedy, insulin, whether for the treatment of a curable or an incurable disease, may well serve as an object lesson to all present and future workers in medicine.

Banting, a young physician, demonstrator of physiology at the Western University, London, Ontario, was hitherto unknown in the scientific world. He had recently returned from the Great War to his former work, and set out determined to find a remedy for diabetes. Almost with one master stroke he touched the hidden secret which opened wide the door of discovery. Within a year the remedy he deliberately sought, was discovered. His belief in the existence of an available internal secretion of the pancreas, proved correct, and the remedy he developed as we now well know, is a success. Hundreds of pathologists, physiologists, biochemists and great clinicians, have spent much of their lives in the study and treatment of diabetes. Their effort was, of course, necessary as a background for Banting's final discovery. Nevertheless, it must have come as a great awakening to the savants in medicine, when the wished for remedy came so suddenly and so unexpectedly from such a quiet spot in the medical world. Today, millions of diabetics may eat and live because they have insulin to meet their metabolic requirement.

In these post-war days, comes the thought that some scientists invent agents to destroy and others to preserve human life. It is nineteen hundred and ten years from the time that Celsus prescribed for a diabetic patient to the time of Banting's discovery of insulin. The gods grind slowly!

However wonderful insulin really is, and however grateful both patient and doctor are for having it, insulin alone is not sufficient. Insulin is but half the buffer with which the ravages of the disease may be stayed. The patient's diet must be correct. Without proper diet insulin may become a useless and a dangerous drug. Even today there are far too many doctors, who permit their patients to eat without measure, and who at the same time give them daily injections of insulin.

Joslin, more than any other of the really great American teachers in medicine, has shown the way, and many of us have demonstrated to our own complete satisfaction, that practically everyone from the age of twelve and upward, can learn the simple arithmetic necessary to calculate the diet.

## STATUS OF THE DIABETIC PRIOR TO INSULIN

In America, extensive laboratory and clinical studies were made by Opie, Joslin, Allen, Mosenthal, Gray, Root, Williams, Schaeffer, Foster, Geyelin, Dubois, Benedict, Folin and others. The clinician, the teacher in medicine and the special investigator in diabetes had a fund of knowledge, but somehow the available information did not seem to find its way to the general rank and file of practitioners of medicine. The general practitioner sighed deeply at being relieved of the responsibility of a case, and therefore referred them to the internist when possible. The internist, to whom the patient was sent, succeeded perhaps in getting the patient sugar free for a time, but because of lack of clear understanding of the entire problem by both doctor and patient, the patient usually lapsed into his former condition shortly after returning home. All this, because the A, B, C of the diabetic diet had not been properly taught. The superstructure was known to many, but the fundamentals of the dietetic treatment of diabetes, were known and applied by comparatively few.

After insulin was announced and given to a number of internists in America for clinical trial, the appeal to these clinics by diabetic patients, was tremendous. In my service at the Presbyterian Hospital the demand for treatment was far greater than we could possibly meet. Hundreds of letters from patients and their families, coming from all over the country, reflected the actual plight of the diabetic. These patients wrote that they had had the disease for periods of from one to twenty years, that they had had all kinds of treatment by numerous doctors, and that in spite of many efforts to regain health, they were growing progressively worse. They invariably asked this one question, "Was there really something that could be done to relieve them of their suffering?" Here were evidences of something very different from the complacent picture of the diabetic patient as described in books. The preceding medical treatment of these patients had been a failure, and they craved a return to health and to their occupations. These letters also made it clear that diabetes was not a disease of the rich, an idea which first appeared in the literature of the Hindus and writings of Avicenna, and apparently accepted by many writers even up to the twentieth century.

Caricature of Sir William Gull, 1816–1890. Physician to Queen Victoria.

One cannot help believing that the great mass of diabetic individuals benefited little from the knowledge of diabetes prior to the advent of insulin. Now after four thousand years of gradually increasing knowledge, the physician is really able to give the relief that is expected of him. We now have at our command not only a suitable diet, but a therapeutic agent of wonderful potency, insulin.

The advent of insulin again awakened the medical profession out of its comparative lethargy by bringing the problem of the diabetic diet to the fore. Even more fruitful than the efforts of the individual physician, was the establishment of diabetic clinics, where patients were taught the elements of nutrition. Diabetic children at the age of ten years began talking in terms of carbohydrate, protein and fats. At a clinic held by Joslin in Pittsburgh, a child of about five years, demonstrated with great accuracy, before hundreds of doctors crowding a lecture hall, the Benedict test for glycosuria and showed an understanding of the terms carbohydrate, protein and fat. Full credit for this diffusion of valuable knowledge in America belongs to Joslin and to those who followed his teachings. Many others have taken up this work, and today, these clinics have become a source of invaluable information for both doctor and patient.

## THE NEXT CHAPTER IN THE HISTORY OF DIABETES

The next chapter in the history of diabetes will be the most interesting of all. It will record the results of metabolic studies by which the keto-antiketogenic ratio was determined; how and why certain amounts of carbohydrate, protein and fat must be given to avoid ketosis. It will record the experimental and clinical evidences which determined the minimal protein requirement of the patient and the amount of protein necessary to maintain the organism in good health; how much protein is needed for an active or a quiet life, how much for the young, the middle aged and for the old; how much for those with healthy and for those with diseased kidneys. It will record conclusions concerning fat in the diet, particularly to what extent metabolic requirement may be safely met with a high fat diet. Even if ketosis can be avoided, how much fat may be given and for how long, without subsequent pathological disturbances. Perhaps there will be forthcoming an answer to the question, are the physiological laws of nutrition and health fulfilled over a long period of time as well as for a short time, when a high fat diet is given? All these and many other questions will have been answered. The next chapter may have definite information as to the kind of diet which best maintains natural immunity against infection.

Then will come the chapter on insulin. We may be told that insulin acts merely by replacing a lost secretion of the pancreas, or that its action is more complex, that it is concerned only with carbohydrate metabolism, that it acts on proteins and fats as well, and also that it stimulates or hormonizes other internal secretions of the body. When such questions as these have been satisfactorily answered and the scientific side of the diabetic problem is on a solid foundation, another great problem will present itself. It is not enough to know these things; they must be applied. After all, the patient must have full benefit of all this, or the science of medicine is a failure.

In medicine we are forever gazing toward the horizon. It is inevitable that the accepted ideas of one day should be replaced by the discoveries of the following day. History teaches man one lesson well, and that is, that man and his efforts are forever in transit. Man in turn teaches history, that within himself there is a procreant urge by which the tomorrow must be made better than the today.

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# JOHN ARDERNE, SURGEON OF EARLY ENGLAND

### *By* ALFRED BROWN, M.D.

OMAHA

IT has been stated often and truly that man is moulded principally by two factors, heredity and environment. Which of these plays the greater rôle is still, and probably always will be, a matter for argument. In whatever way one decides the question, of one thing there can be no doubt that in order to evaluate properly the accomplishments of any man and place him, as best we may in his fitting niche in history, these two elements, when possible, should be taken into consideration. In the case of the first of these, heredity, the feat is at times difficult of accomplishment, especially when the study is of a man of the middle ages such as John Arderne who lived during the major part of the fourteenth century. Of his heredity and immediate family we know nothing. So we must confine ourselves to the study of his environment and here the problem is different for of this we do know something and can partially at least reconstruct it by a review of the general conditions of the time in which he lived.

In the case of John Arderne this study carries us back to one of the most interesting times in the world's history, the latter part of the medieval period when that flickering spark of the waning science and art of the early Greeks, kept alive by the Arabians through many centuries, was breaking into a feeble flame, fanned by the efforts of such as Arderne, and destined later to blaze anew and again furnish light for an era of progress ushered in by the Renaissance and continued to the present day. It carries us back to the time when two figures, the monk and the knight, held the center of the stage of the world. The monk, theoretically having little or no interest in mundane affairs but practically their guiding hand, had, in the eleventh century through his religious zeal made an error which was to cost him much of his domination. The pilgrims, in their journey across Europe and the Mediterranean to the Holy Land had been mistreated by the Moslem until finally these men, searching for consecration at Christ's Sepulchre, began to travel in bands under arms. This was taken as an opportunity by the cleric to foster an offensive spirit on the part of Chivalry. Chivalry had already taught the laity that it was proper to defend by force what was right but as time went on, the idea urged by the monk grew, to take the offensive and capture from the Moslem the Sepulchre of Christ and restore it to its proper guardian the Christian Church. So this Pilgrim's Progress turned into a Holy War and the knight in his glittering armour came to take his stand beside the monk, both intent on a common purpose. In the attempted carrying out of this purpose during the crusades however the people did not know whether to follow the monk or the knight, for the close contact of the warrior and his followers with the culture and knowledge of the Saracen resulted in the building of a new Europe through the influx of new ideas.

While the crusades were in the making, Constantine, the African, had come to Salerno and then to Monte Cassino and had translated the works of the early Greeks, and late Arabians, into Latin and thus taught the continental Europeans the then advanced surgery. In part through his efforts and in part because Salerno became the great military hospital for the crusaders the teaching and practice of surgery and medicine took firm root in Southern Europe. From there it spread, in part directly and in part through the Western Caliphate situated in Toledo and Cordova, until it reached Paris and Montpellier where the great schools were founded, and finally surgery reached Oxford, England.

With this revival of medical and surgical learning on the continent a veritable succession of famous surgeons began. Constantine, the African, was followed at Salerno by Roger, Roland, and the Four Masters. Arnold of Villanova and Henri de Mondeville worked and taught at Montpellier. In opposition to the Paris Faculty where clerics only could teach, Jean Pitard founded the College de St. Côme to which Lanfrancus of Milan came in 1295 and after becoming a member began to teach surgery by lectures and demonstrations. Finally in the early part of the fourteenth century the father of modern surgery arose, the great Frenchman, Guy de Chauliac.

So the stage was set and the pathway made for an Englishman to carry the surgery of the continent to England and there carve for himself a niche in the Hall of Fame. Gilbertus Anglicus and John of Gaddesden had practiced in England and the latter had become the Professor of Medicine at Oxford but there was little new or original in their surgical work. John Arderne grasped the opportunity and became the first great English surgeon.

Born in England in 1307, and practicing in England most of his life he has left little autobiographical data. He does not tell us where he received his preliminary education and later studied medicine. That he received a fairly good education is self evident for he wrote his work in passable Latin, and that he studied medicine and received as much instruction as the times could give appears reasonable for he describes himself as "Chirurgicus inter Medicos," Surgeon among Medical men. Can this mean other than that he was educated as a physician and attained all the eminence and self constituted authority that the physician of those days assumed and then took up and practiced surgery? Baas[1] says that he "had probably studied at Montpellier" and considering the impetus that Henri de Mondeville had given to surgery at Montpellier it is possible that this had held over to the time of John. Such would have had to be the case for de Mondeville died when Arderne was but eight years of age. As was commonly the case with many men of his period he did not spend his entire professional life in one place. Though generally known as John Arderne of Newarke he did not settle there until he was forty-two years old. In 1346 he served as Sergeant Surgeon in the army of Edward III which fought the French at Crécy. After his return he practiced in Wiltshire and was there when the Black Death swept England in 1348. The following year found him moving to Newarke where he remained until 1370. There he gained a great reputation as a Surgeon and built up a large practice. In spite of this he moved again, this time to London, where so far as is known, he remained until his death, the exact date of which is uncertain.

As one reads the surgery of these years of the Middle Ages the constant repetition of the stone, fistula and hemorrhoids gradually forces on the consciousness the great prevalence of these diseases. Stone in the bladder, if the diagnosis was not confused with that of enlarged prostate, was much more common in those days than it is now. It offered a good field for a young and ambitious surgeon save for the fact that its treatment was mostly in the hands of the itinerant and ignorant barber surgeons. But the treatment of the diseases of the anal canal held no such stigma and this young surgeon, with both preparatory and surgical training and in addition the knowledge of wound treatment he had acquired during his experience as a war surgeon, evidently decided to devote himself largely, though not exclusively, to the specialty of fistulae, not only of that in ano, but also to fistulae in any part of the body. It is, however, as the originator of the operation for fistula in ano that he is best known.

Arderne's original works are in manuscript. Certain of them however, have been translated and printed. In 1883 Gore[2] described a manuscript entitled "The Works of Master John Arderne, Chirurgeon, of Newarke, in Nottinghamshire, written by his own hand, in the year of our Lord 1349, with some Observations collected in blank paper by Walter Hammond, Chirurgeon, 1645." The manuscript consists of 440 pages with numerous illustrations. Preceding this, Arderne's work on fistula had appeared in the works of Franciscus Arcaeus translated by John Read[3] in 1588. The latter part of the title reads "With a treatise on the Fistulae in the fundament, and other places

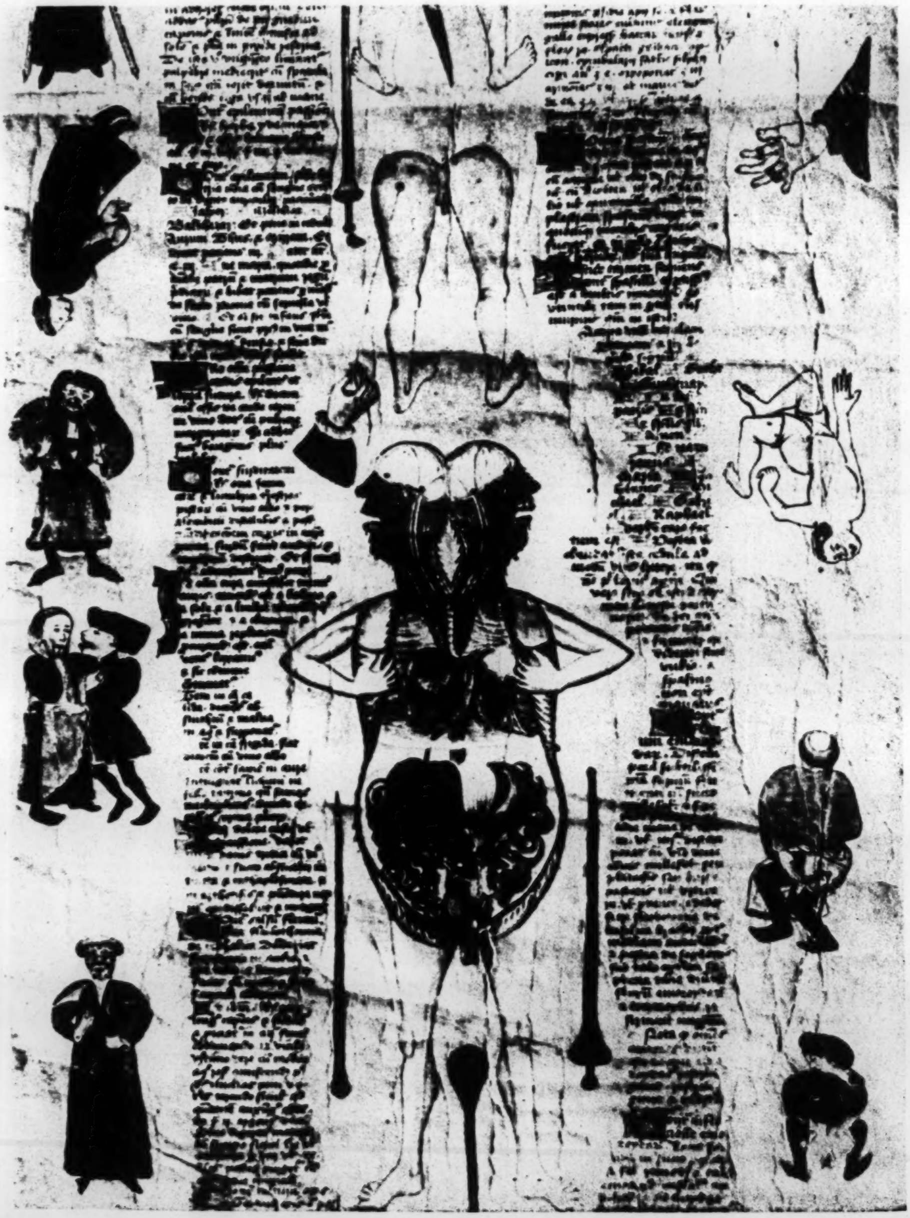

FIG. 1. ILLUSTRATIONS FROM "DEARTE PHISICALI ET DE CIRURGIA" OF MASTER JOHN ARDERNE, SURGEON OF NEWARK, DATED 1412 SHOWING FALLING FIGURE. COURTESY, *Surgery, Gynecology & Obstetrics*

of the body, translated out of Johannes Ardern etc. London 1588." A still more recent translation of Arderne's manuscripts is that by Sir D'Arcy Power[4] published in 1922, as the first of the Wellcome Historical Medical Museum Research Studies in Medical History. This manuscript which is entitled "The practice of Master John Arderne of Newarke in the art of Medicine and Surgery, 1412," was written after his death but gives considerable of his work concerning fistula and also gives much of the absurdities of his medical ideas for, though advanced in Surgery, Arderne, bound by the traditions and superstitions of his time, used the then prevalent ridiculous medical treatment for internal disease.

It is interesting to note that Arderne's manuscripts are illustrated. This was an innovation in surgery. Anatomy had been illustrated as had also obstetrics and some illustrations of instruments had appeared in the manuscripts of the Arabians but here we find a man who was illustrating the lesion itself and endeavoring to convey to the reader his ideas of living pathology by means of visual impressions, a method which has gradually developed until today it is the foundation rock upon which all pedagogic ideas in medicine rest. See the lesion and then file it away in the visual memory. If he had done nothing more John Arderne would deserve a high place in medical history for this service alone.

Being one of the few well educated men to enter the domain of surgery and knowing the low type of the usual surgeon of the short robe of the day, John was naturally anxious to put his standards before his audience so he writes:

> A description of ye qualities and conditions which ought to be in ye surgeon that performeth this or any other operations in Chirurgery: First, that he be devout. Secondlie, charitable to ye poor. Thirdly, to use few words. Fourthly, to avoid drunkenness. Fifthly, to be chaste both in words and gesture as well as to fear ye not. Sixthly, not to undertake an incurable disease.

In this last connection after having told of a large number of persons that he had cured of the fistula John says "Nevertheless I afferme not that I mist hele al fistulae in ano for some ben incurable as it shal be said within when I shal trete of tham." His operation for fistula consisted in first passing a metal sound through the fistula until the internal orifice was found, this instrument was called "Sequere me" (Follow me). The structures between the tract and the bowel were divided either by passing a thread through the fistula and out of the anus and tightening it until it cut through or by incision with a knife. In either event the entire tract was to be laid open. This, in its ultimate aim, is practically the modern operation. In addi-

FIG. 2. ENGRAVED TITLE PAGE OF "RELIGIO MEDICI." FIRST UNAUTHORIZED EDITION, 1642. FROM KEYNES' BIBLIOGRAPHY OF SIR THOMAS BROWNE.

tion to the "Sequere me" John used the "Acus rostrata," "a snouted nedle," a wooden "Tendicula," a thread called the "frenum cesaris," and a "syringa" which he describes as "an holow instrument by the midez, and it ow to be made of the shappe as it is peynted here nouther greter ne longer but even fater the shappe as it is peynted here, ne have it no 3 + but oon hole in the nether ende or smaller ende as it is peynted here." This is evidently for irrigation of the wound.

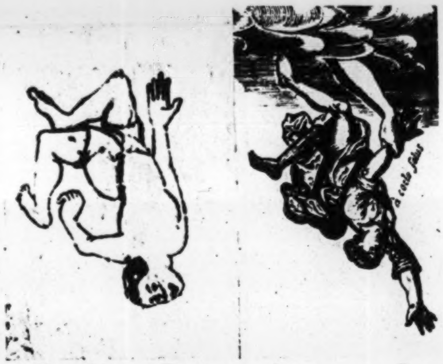

FIG. 3. THE FALLING FIGURES OF ARDERNE AND BROWNE.

John Arderne recognized also ischiorectal abscess and its etiological relation to fistula in ano. He advised that they be treated by plasters and then laid open and dressed. His treatment of fistulae in other parts of the body was also incision and dressing. His treatment of wounds consisted of ointments and various medications but it is interesting to note that a good deal of washing with hot and cold water was also done.[4] I quote one case:

> An injury to the leg which I cured in a nobleman when he had suffered from it for eighteen years. I first removed the flesh down to the bone with an ointment of roses and I scraped it every day. And one day when I was scraping the bare bone with an instrument it moved upwards and downwards. I watched this remarkable node but for the rest I gave up any further operation and put nothing over the wound except lycium mingled with new honey and the yolk of a raw egg applied on carded linen stupes and I did this from day to day until the aforesaid bone with the flesh receding from it, appeared at the end of the wound and became more and more moveable. And when I saw this I put the point of a scalpel under the edge of the bone and raised it little by little. But that piece of bone was four thumbs in length and two thumbs in breadth and in thickness it extended nearly to the marrow of the bone and it was in front of the tibial bone i.e. schyn bone. After the separation of the bone I finally closed the wound with a lycium dressing of honey &c. and the yolk of raw eggs.

The work of John Arderne as exemplified in the Stockholm manuscript seems to me to be connected with one of the most famous books in English literature; the book of which the great physician of our generation Sir William Osler thought so much, the "Religio Medici." As the title shows, the book deals with the religion of a physician. It first appeared in 1642 but in this edition there was no hint given as to the identity of the author, only the name of the publisher, Andrew Crooke, was mentioned, and he took no responsibility for the opinions expressed in the text. Immediately the book attained a great popularity and the first edition was sold out so rapidly that a second edition was required the same year (1642). This second edition also lacked the name of the author and it was not until the following year (1643), when the book was again published that Thomas Browne acknowledged the work as his. In Browne's introduction to the third edition he says that he had shown and loaned the original manuscript to some friends and that they had surreptitiously had it published in an imperfect state and that he in the edition of 1643 was publishing it correctly for the first time. The book therefore is distinguished as having both a first and second surreptitious edition and a first authorized edition. Whether the two editions of 1642 were really printed without Browne's knowledge has been questioned by good authority.

One of the most striking points about the book is its title page which appeared in the first five editions, including in this number the two surreptitious publications.

This represents a figure falling head down from a high rock; a hand reaches out from the clouds and grasps the wrist of the falling figure. From the mouth of the figure come the words *a coelo salus*, from Heaven, deliverance. The plate was engraved by one Will Marshall and appeared as the title page of both the first and second unauthorized editions which were published by Andrew Crooke but when Sir Thomas Browne published the authorized edition the next year the title page, with a few changes, was retained, and Crooke remained the publisher. Of this title page Geoffry Keynes[5] says, "The source of the design is not known, but it presumably arose from Marshall's fancy. Clearly it met with Browne's approval for it was used in all the editions, except one, that were published during his life time." The idea that the title page was a figment of an engraver's fancy, though a bit far fetched, might hold, provided no better reason could be found. The figure represents man falling—here physically but by inference morally, while Heaven or God, in the shape of a hand, religion, is affording him safety. The story of the book, The Religion of a Physician, is told in the title page.

When we turn to the Stockholm manuscript of John Arderne's work written in 1412; in the right hand column of the fourth plate of the Power reproduction the second figure from the top illustrates a figure falling which very closely resembles the figure of the title page of the "Religio Medici." It is undraped and the legs are transposed but the characteristic dorsiflexion of the head appears in both and the facial expression is very similar. It is the first illustration of opisthotonus in medical literature. But the similarity of the two figures means very little unless there is something further that will apply to the comparison. The words of John Arderne which accompany his figure seem to supply this lack. He says:

> Against spasm i.e. cramp. The following CHARM has been found most satisfactory in cases of cramp by many who have used it both in foreign countries and at home. Take a sheet of parchment and write on it the first sign ⊞ Thebal ⊞ Suthe ⊞ Gnthenay ⊞. In the name of the Father ⊞ and of the Son ⊞ and of the Holy Ghost ⊞ Amen ⊞. Jesus of Nazareth ⊞ Mary ⊞ John ⊞ Micheal ⊞ Gabriel ⊞ Raphael ⊞ The Word was made Flesh ⊞. The sheet is afterward closed like a letter so that it cannot be readily opened. And he who carries that charm upon him in good faith and in the name of the Omnipotent God and firmly believes in it will without doubt never be troubled with the cramp.

Power adds a footnote to amplify the subject; he writes:

> The section on the treatment of cramps by a charm is much abridged. The writer has omitted the fact that Arderne obtained it "from a certain knight, the son of Lord Reginald de Grey de Schirloud near Chesterfield, who was at Milan with the Lord Lionel, at the time when the Lord Lionel, son of the King of England, married the daughter of the Lord of Milan. The English there were troubled with spasms due to their potations of the strong and hot wines of the country and of too many carouses. The knight had with him the following charm and saw a certain gentleman so troubled with the spasm that his head was drawn backward nearly to his neck, just like a crossbow, and he was almost dead from pain and starvation. And when the said knight saw this he brought the charm written on parchment and placed it in a purse and put it on the neck of the patient whilst those who stood by said the Lord's Prayer, and one to our Lady Mary, and as he swore faithfully to me, within four hours or five he was restored to health."

Here is the element of heavenly intercession for the saving of the figure. The addition of the rock, the sea, and the heavenly hand readily suggest themselves.

If this hypothesis be accepted it seems rather unlikely that an engraver would be acquainted with the work of John Arderne. That Browne would know his work is not at all unlikely as he was considered to be one of the best read men in medicine of the early seventeenth century, and this makes it appear very likely that Browne himself suggested the subject of the title page. If this be so it follows that Browne knew of the first and second unauthorized editions and in fact consented to their publication. Wilkin[6] calls attention to the fact that Dr. Samuel Johnson[7] in his life of Browne suspects him "of having contrived the anonymous publication of the work in order to try its success with the public." Keynes rejects this by saying "but our knowledge of Browne's character is sufficient disproof of his having been guilty of any such sharp practice." But would it have been sharp practice? It was commonly done in those days. Not only to try out the success of a book with the public but also to ascertain the feelings of royalty and its reaction to the publication. Royal displeasure when aroused showed itself in no uncertain ways and religion was a ticklish subject to write about. As it was, the appearance of the work raised a storm of criticism but this blew over and the following year Browne published the work under his own name, of course disowning the previous editions, but he kept the title page and employed the same publisher who had printed the previous editions though he describes this book as "A true and full coppy of that which was most imperfectly and Surreptitiously printed before under the name of: Religio Medici." A further fact which would make one think that Browne knew of the previous editions is that in the 1643 edition he prints "A letter sent upon the Information of Animadversions to come forth, upon the imperfect and surreptitious Copy of Religio Medici; whilst this true one was going to the Presse, signed Your Servant, T. B. Norwich, March 3, 1642." This statement would make it appear that Crooke had charge of the true manuscript and was arranging for the printing of it and at the same time was getting out the surreptitious editions, for Browne's letter is dated in March 1642.

When we look back over a period of more than five centuries, we can visualize standing with the poets Geoffrey Chaucer and John Gower, the figure of this surgeon of Early England, John Arderne, who did great things for his science. He was the first to teach surgery by illustration of the living pathology as he saw it. He was the first educated operating surgeon in England and devised an operation for fistula in ano, the principles of which hold good today, and he may have furnished the inspiration for the title page of one of the most famous books in medical literature, the "Religio Medici."

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# A FULL VIEW OF ALL THE DISEASES INCIDENT TO CHILDREN

## ALSO RECORDING AN EARLY CASE OF INFANTILE CEREBRAL HEMORRHAGE THE EARLIEST PEDIATRIC ANTHOLOGY

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"THE library of the Surgeon General numbers a very rare volume among its thousands of rare volumes, an item which one may assume with a reasonable degree of certainty to be the first pediatric anthology."[1] Perhaps then, one may be pardoned for writing more at length about this little book; although probably not so rare, it deserves a better place in medical history than it has been accorded. That the editor is unknown adds somewhat to its charm. He exhibited discretion in his selections; and those from whom he chose to abstract have stood the test of time, and with one or two exceptions, are still cherished for their contributions to the development of medicine.

Surely if our editor made any attempt to hide his identity, he did very well for there is nothing in the book to indicate the authorship. G. F. Still in his article on "Some Seventeenth Century Writings on Diseases of Children" attributed the book to John Martyn (1699–1768). His authority was the Library Catalogue of the Royal College of Physicians. In attempting to confirm this reference however, one cannot but infer that Martyn was not the author. My conclusions were arrived at independently but as they are practically identical, I shall quote Stills' later conclusions:

> I have since found that the catalogue is almost certainly in error. John Martyn did translate Walter Harris' "De morbis acutis infantum," and, I suppose, the fact that the chief ingredient of "A full view" is a translation of Harris' book led to the mistake; especially as John Martyn's translation and "A full view" were both published in 1742.
>
> Actually this identity of date makes it, I think, practically certain that the translations are not both by John Martyn, for they are entirely different in wording and style. Moreover, the prefaces are also quite different in style and substance.
>
> It is highly improbable that one man should have issued two such different translations in the same year. If the translation of Harris in "A full view" is not by Martyn, then there is no reason whatever, so far as I can see, for supposing that the rest of that compilation is by him.[2]

It may be added that in 1742, Martyn published an "Abridgement of the Memoirs of the Academy of Paris in 5 Vols." which would have made him a very busy man; and also "A full view" is not mentioned in the list of Martyn's works, as given in the "Philosophical Transactions of the Royal Society of London, 1809."

The evidence, then, is conclusive that some one other than Martyn wrote the book. Whatever we can learn about this anonymous worthy is gleaned from his brief preface. He complains of the neglect of his contemporary medical authors toward infants and children because they have not the power of speech to describe their complaints, and because the infants' fate is thereby resigned to the "Nurses and old Women"; here he anticipates Armstrong on the same thesis.

As will be shown later, he was very free in collecting what was of value from the various authors, in most instances omitting their theories which he said were more amusing than instructive and quite foreign to his purpose.

He greatly admired Walter Harris, believing that his theory was rational and founded upon practice. Lamenting, however, that

Harris had only written on the acute diseases of infants, he undertakes to supply this defect by adding abstracts of some of the best authors, "who have writ upon the Chronical Diseases of Children, as well as those Acute Ones, which he has omitted."

Our editor must have been a practitioner, besides a translator, for in his preface he gives a few personal observations on whooping-cough and notes the differences in the management of patients of different ages, regarding the doses of medicine etc.

The book was printed for A. Millar, over against St. Clement Danes Church in the Strand, MDCCXLII.

Andrew Millar (1707–1768) was one of the most notable printers of the eighteenth century. Boswell noted that although he was no great judge of literature he showed a keen sense in selecting very able men for literary counselors. He printed books for Thomson, Armstrong, Fielding, Robertson and Hume, and was chiefly responsible for conducting Samuel Johnson's "Dictionary" through the press. It is said, in this connection, that he was sorely tried by Johnson's lack of punctuality and, on receiving the last sheets, exclaimed "Thank God I have done with him." This, being repeated to Johnson, was smilingly answered, "I am glad that Millar thanks God for anything."[3]

Incidentally Millar lost two children in early infancy, just previous to the time at which this book was published, which may have had some bearing on its conception.

Some facts that may be of interest to future workers in this particular field concern John Armstrong (1709–1779) as the possible compiler of these works. Although holding a medical degree (Edinburgh 1732) he is known to us chiefly as a poet. His "Essay on the Art of preserving Health" (1744) is one of the finest specimens of didactic poetry in English. Armstrong sometimes published anonymously ("Essay for abridging the Study of Physick," 1735). In 1737 he published "A Synopsis of the history and cure of the Venereal Diseases," which was a collection and abridgment of several writers. We also know that he was a friend and advisor of Andrew Millar, who printed many of his works. Further, he was probably interested in pediatrics for he is said to have assisted his brother George in writing the "Essay on Diseases most Fatal to Infants."

In this somewhat belated book review, there is no intention to cover in full the life or writings of these various famous authors. In most instances each one has been made the object of study in recent writings. Only as each one concerns us in this anthology will we enlarge upon his work. And as a word of caution let me quote from Walter Harris, "But there seems to be a kind of medium kept up, so to speak, in the knowledge of different Ages, so that one may not exclaim against the ignorance of another." In other words, let's not smile at their theories or their therapy, lest future ages smile at ours.

### Harris upon the Acute Diseases of Infants

Walter Harris (1647–1732) was the outstanding pediatrician of the seventeenth century. His chief work "De Morbis Acutis Infantum" appeared in 1689 and went through many editions and translations. Martyn, in his translation, refers to a previous uncouth rendering of Harris which was then out of print. It must be clear that Martyn could not have been referring to the translation in "A full view" for, although very liberal, it certainly is not in an "uncouth style" and could not have been out of print for it was noted among the new books in the May issue of the *Gentleman's Magazine*. Undoubtedly Martyn has reference to "An exact Enquiry into, and Cure of, the acute Diseases of Infants. By Walter Harris M.D. English'd by W. Cockburn M.D. and F.R.S." which was printed for Tho. Astley in 1693 or 94.

We can conclude then, that there were at least three English translations of Harris by as many different authors. According to our compiler, the treatment of infant's diseases, previous to Harris was merely guess work. "That sagacious Physician was the first who attempted to put the Practice upon Infants on as certain and rational a Footing as that upon Adults; and how well he succeeded in this laudable Attempt, I leave to those to judge who will only be at Pains to read him, and put his Experiments to the Trial." Harris' doctrine: that "all the complaints of infants spring from an acid as their common source" was, as we shall see, derived from Sylvius, but it was Harris who popularized it and who was reponsible for its effect for nearly a century. It has already been pointed out that Harris had treated convulsions (tetany) with calcium.[4] "As to convulsions, or those slight Convulsive Paroxysms, which improperly go under the name of Epilepsy. . . . The same testaceous medicines . . . are much more efficacious."

Aside from Harris' self-esteem, or "pardonable vanity" if you will, there is something appealing about his writing that may perhaps have contributed to his popularity. Listen to his description of a dying infant: "The Eyes are lifted to Heaven (the proper Mansion of unspotted Innocence) and thus the poor infant is untimely cut off, before Reason can have taught it from what a World of Care and Misery it is relieved."

He, like a true pediatrician, laments that so many "Ladies of Quality" do not nurse their babies, in order that they may have "more Time to dress, receive and pay Visits, attend public Shews, and spend the Night at their beloved Cards." Perhaps it was Harris' influence that made Richard Steele devote one of the issues of the *Spectator* (December 12th, 1711) to this very subject.

### Boerhaave on the Diseases of Children

Hermann Boerhaave (1668–1738) was the outstanding physician of his age. A man of culture and broad education, he established an enviable reputation and attracted students from very distant countries for many years. His contributions to pediatrics were not great. His "Aphorisimi de Cognoscendis et Curandis Morbis, Lugd. Batav. 1709," contains the subject matter from which our editor gathered material for this chapter. It corresponds closely with the aphorisms (1340–1378) according to van Swieten, one of his pupils who published and commented on them. Boerhaave mentioned briefly diseases due to "Mucus in the Primae Viae," "retention of meconium," "coagulated milk," "worms" and "teething." Convulsions may be due to almost any of the above diseases. No doubt this chapter was included more from its being connected with a great name, than for the pediatrics it contains.

### Franciscus de le Boë Sylvius upon the Thrush

The life and writings of Sylvius (1614–1672) are well known to general medicine. Here is an early pediatrician, perhaps influenced by Harris, perhaps not, but at least recognizing the value of what Sylvius wrote on diseases of children and including it in this collection of masterpieces.

Sylvius' book (Praxeos Medicae liber quartus. De Morbis Infantum. Amstelodami, 1674) had been translated into English by Richard Gower in 1682, which thus antedated the appearance of Harris' first edition (1689). Sylvius had written on other pediatric subjects such as icterus, worms, smallpox, measles, difficult teething and epilepsy but we are here given only his description of thrush. The cure depends on correcting the acid *humours* by means of absorbents such as crab's eyes, pearls, coral, chalk and the like; and having them evacuated by gentle hydragogues such as the syrup of succory with rhubarb.

It is easy to see the influence that this therapy had on Walter Harris, who acknowledges his indebtedness by saying that Sylvius was the best author he had read on the diseases of infants, even though he thought it necessary to label him as "the opiate doctor."

### Willis on the Epilepsy

Although this "sacred disease" was known to the ancients and frequently described in the older medical literature, we only have to go to Thomas Willis (1621–1675) to find a well-nigh perfect clinical description. Just a few lines taken at random to show his style:

> Besides, the Paroxysms are some times gentler and very soon over, so that the Patient scarce falls down, or loses his Senses; and sometimes they are more violent, so as to deprive him of all Sense for several Hours together, and torture him with horrible Symptoms, as if he were possess'd with a Devil. Sometimes, tho' but rarely, the Patient is forewarned of the coming Paroxysm by certain Signs, as a Weight in the Head, flashing of the Eyes, and a tinkling Noise in the Ears.

He further states that epilepsy may be hereditary or acquired, primary or sympathetic. Willis undoubtedly includes those cases that we would now classify as tetany, but such an accurate observer did not fail to notice some distinctions:

> Children and young People are more Subject to this Disease than Adults, or those who are advanced in Years; but in Infants for the most Part it goes under the Name of Convulsions.
>
> Convulsions in Children, especially if they proceed only from some Disorder in the Stomach, or Intestines are more easily cured, than the Epilepsy in Adults.

The therapy of the age is reflected in his cures: "An Amulet made of the Roots and Seeds of Male-Peony, with a little Elk's Hoof, should be hung about their necks," and mistletoe, castor, powdered human skull, pearls, and amber are mentioned as "Specificks."

Careful clinical observations distinguished Willis and other English physicians of the period. He has already been credited with being one of the first to describe puerperal fever, myasthenia gravis, the sweet taste of diabetic urine, the network of arteries at the base of the brain, the eleventh cranial nerve, to say nothing of his complete description of the nervous system. Perhaps it may be well to record another observation on infantile cerebral hemorrhage, which if not the earliest, surely is one of the earliest descriptions of this disease on record:

> Some time ago a Woman in this City had several children who died of this Disease; at length we dissected the Head of the fourth Child, which died within the first month, like the rest. There was no collection of Serum in the Ventricles; only the substance of the Brain, and its Appendages was moister, and less firm in its Texture than usual. But what was most remarkable, in the Cavity below the Cerebellum, immediately above the Trunk of the Medulla Oblongata, we found a considerable quantity of grumous Blood. But it is uncertain whether that matter was contained there from the Beginning of the Disease, and so produced the Convulsions, or whether it was forced out of the Blood Vessels by the Contraction of the neighboring Parts during the Paroxysms, and so ought rather to be considered as the effect, than the cause of the Disease.

The original of this appeared in Willis' "Pathologiae cerebri et nervosi generis specimen Oxford 1667." For the sake of completeness I shall quote the original (p. 49):

> Olim in hac urbe cujusdam mulieris nati plures ex hoc morbo interierunt; tandem faetus quarti intra mensem, uti priores, interempti, caput dissecuimus; nulla hic serosa collovies ventriculos inundabat, sed cerebri tantum, ejusque appendicis substantia erat justo humidior, & laxior; quod potissimum observatu dignum erat, in cavitate quae cerebello subjicitur, supra medullae oblongatae caudicem, sanguinis grumosi, & velut concreti copiam insignem reperiebamus: at vero incertum est utrum materies ist haec ibidem ab initio deposita spasmos primario intulerat; an potius sanguis iste a partium circumcirca consitarum contractione expressus, & extravasatus, convulsionum effectus, & productum, ac minime istarum causa fuerit; Nam & in Apoplecticis ejusmodi Phaenomenon passim occurrit; quod tamen morbi effectum potius quam causam esse post haec ostendemus.

### SYDENHAM ON THE SMALL-POX AND THE MEASLES

Two chapters are taken after Sydenham on the smallpox and measles respectively. No comment of mine is needed about the great Sydenham. As Walter Harris has said "all future Ages will ring his praise as long as Medicine shall be in any Esteem."

Although "The whole Works of that Excellent Practical Physician" had been previously translated (1696) by John Pechey, M.D. of the College of Physicians in London, our compiler must have used an original translation as it is very different in wording and style from Pechey's, besides being somewhat abridged.

Both chapters are taken from "Medical Observations" the description of smallpox from Section III, Chapter II and the description of measles from Section IV, Chapter V "Of the Measles in the year 1670."

I cannot miss this opportunity to call attention again to his description of measles for to this day with the exception of Koplik's spots we have added very little except that which we have learned with the aid of our instruments of precision.

He observes that it generally attacks infants with fever, thirst, loss of appetite, distressing cough, continued drowsiness, and discharge from the nose and eyes. He also notes swollen eyelids, sneezing and diarrhea. He gives a minute description of the rash, its appearance, mode of spread and the branny desquamation. The disease is sometimes prolonged by fever, difficulty in breathing, "peripneumony" and diarrhea.

One can hardly do justice to his description by any summary.

Before dismissing Sydenham, we must accuse our editor of a serious oversight. No collection of children's diseases could be complete without that classical description of chorea which must have been accessible to him.

### ANDRY ON WORMS

Nicholas Andry (1658–1742) of Lyons received his degree at Rheims. He was admitted to the faculty at Paris (1679). He possessed a great deal of merit but a good part of his time was taken up in disputes with his colleagues with whom he perpetually quarreled. While Professor of Medicine in the Royal College he wrote on orthopedic surgery (Orthopaedia: or the art of preventing deformities in children etc. Translated from the French, 1743. Printed for A. Millar). He originated the name "orthopédie."

Another of his numerous works was entitled "Traité de la génération des vers dans le corps de l'homme" which passed through numerous editions and translations. The English translation appeared in 1701. This book was severely criticized by his colleagues but let the inimitable Atkinson comment on it for us:

> Andry's book on worms feels queer, it sounds queer, and reads queer . . . He has also given us Aphorisms on worms. Most of the distempers ascribed to witchcraft proceed from worms. I dare say there were some Hydatid maggots among Andry's worms, and I very much doubt, whether the gentleman who gave Andry the nickname of Vermiculosus, had the address to preserve himself eighty-four years on this side the grave before he himself was actually reduced to become an "Homo Vermiculosus" within it![5]

This unique nickname had been given to Andry by one Valisnieri, who thought that Andry pretended to find worms at the bottom of every disorder. At this late date we can only say that among the laity, at least Andry must have made a lasting impression.

Our editor has kindly cut Andry's two hundred and sixty-six pages down to five, but even then thought it necessary to include some forty-five different remedies. In all fairness, however, he gives a reasonably good classification, mentioning:

> The round and long Ones breed in the Small Guts, and sometimes in the Stomach; the second Sort [i. e. round and short ones] breeds in the Intestinum Rectum, and are called Ascarides; and the third [i. e. broad kind] are hatched either in the Stomach or small Intestines, and are called Tenia from their resembling a Ribbon.
>
> The Tenia is white and very long, and its Body is all over jointed. There are two Kinds of this Worm: One properly called the Tenia, that neither moves nor has any formed Head

> [a mild reflection on the efficacy of Andry's forty-five remedies]; the other called Solium, which moves, and has a very regular round Head, resembling a Wart.
>
> Some Authors mention another Sort of flat Worms, called Cucurbitariae, which are very short, and sometimes linked to one another like a Chain.

Among a veritable host of symptoms he mentions fevers, loss of appetite, colic, distention, convulsions, itching of the nose, night cries and "fames canina."

Of course there is very little original here, many of the earlier pediatricians having contributed to this subject but after all, it wasn't a bad working basis for that time and forms a very necessary chapter to our little compilation.

### Burton on the Chin-cough

John Burton (1697–1771), antiquary and scholar, achieved great eminence in the practice of medicine at York. He attended Christ Church (College) but received most of his medical education on the continent. He was very proud of his instruction under the eminent Boerhaave, for such was the reputation of Boerhaave in that day, that to be merely an attendant on his lectures was considered as a qualification for honors and esteem.

His "Essay on Midwifery" was considered a most learned and masterly work.

Burton seems in some way to have been involved with the forces of the Pretender. Atkinson mentions that he was a "strong political partisan of his day, when party ran high" and it was his political opinions that influenced Sterne to satirize him as "Dr. Slop" in "Tristram Shandy."

In 1738 Burton published "A treatise on the non-naturals . . . To which is subjoined a short essay on the chin-cough etc." He dedicated it to the "eminent Hermann Boerhaave" and further mentioned that one of his reasons for writing it, was to show his readers that he hadn't wasted his time as a student.

It was this essay on the chin-cough that formed the basis for the chapter in our anthology. It is copied almost completely but we are spared the long pseudo-scientific discourse on the value of combining cantharides with camphire which Burton introduced and used as a remedy. One is here reminded of Sterne's remark that "Doctor Slop made ten times more of it, than there was occasion." He mentions the epidemics in 1731–1732 and also speaks of convulsive fits. Aside from that there is nothing of value, but let our editor comment on it himself:

> The Chapter upon the Chin-Cough will, perhaps, be reckoned somewhat Lame; and indeed the Author who treats of it, is candid enough to own that his method will only succeed in one kind of Chin-cough, viz., when it proceeds from a tough viscid Phlegm; but is not proper when a thin, sharp Rheum is the Cause of the Disease. But considering the Success of that method when properly conducted, it certainly well deserved a Place in this Collection. For if it is not the most fatal, it is perhaps as obstinate and cruel a Disease, as most that Children are liable to. And this may be one Reason why scarce any have touched upon it, except Systemical Writers, who were obliged by their Plan to say something of it. Bleeding, Purging, Vomiting and Blisters are the common Practice. But even all these, though used in the most prudent manner, are oft found insufficient to perfect a Cure, and Nature will have her own Time in spite of all that can be done.

Whooping-cough had been known for a long time and previously described by Baillou, Willis, Sydenham, Ettmüller and others. Of course it is impossible to say why our editor should include among the other classics this "lame" chapter. Perhaps because it was the last word, perhaps because of a new remedy. At any rate this "Cantharides cure" was improved upon by a Mr. Abraham Sutcliff, a Surgeon Apothecary at Settle in Yorkshire, and borrowed from him by Dr. Lettsom who in turn passed it on to George Armstrong who recommended it in his "Account of the Diseases Most Incident to Children," some thirty years after its introduction.

### GLISSON UPON THE RICKETS

Our editor says in his preface that he has added to this translation of Walter Harris, "an Abstract of some of the best Authors, who have writ upon the Chronical Diseases of Children." With that in mind we have a right to expect him to notice a book that, although written nearly one hundred years before, was regarded then as well as now as one of the milestones in the progress of English medicine, a real monument to painstaking observation both on the living subject as well as at the post mortem. The time may come when rickets itself will be a matter of history, but the name of Francis Glisson (1597–1677) will never be omitted from any true account of historical medicine.

Glisson's book appeared in 1650 and passed through many editions. As early as 1651, however, probably for the benefit of those of "lesser capacities" it was translated into English by Phil Armin. Here again we find our editor using his blue pencil for as far as wording is concerned, one could hardly recognize this as a translation. It is an abridgement in its true sense. Here we have Glisson, his remarkable observations on the incidence of the disease, its pathology, causes, diagnosis, prognostics and cure, but a Glisson without his verboseness, without his extreme fondness for detail.

Concerning his life and writings little need be said. The reader is referred to articles about him by Ruhräh, Still and others. I would only like to call attention to one interesting, though perhaps unimportant detail; on page two-hundred four of this book there is mentioned among the various cures,

> Take of *new Cow's Milk* warmed, three four or five Ounces.
> Anniseeds in Powder, ten Grains
> Common Sugar an Ounce, an Ounce and Half, or two Ounces
> Mix with them the *Yolk of one Egg*, and make a Clyster; to which may be added
> Half an Ounce of *fresh Butter*.

What a pity he used it as a clyster!

### WISEMAN ON THE KING'S-EVIL

Richard Wiseman the "Pride of England" is selected as the author of the last refreshing chapter, on the King's-Evil. Being a fervent royalist and in the service of the Stuarts, it was only natural for him to believe in the royal kingly touch. He has been compared with Paré and is said to have done for surgery what Sydenham did for medicine. His "Severall Chirurgical Treatises" (1676) shows him as a keen clinical observer with an easy pleasant style. Samuel Johnson is said to have consulted Wiseman's works, in the compilation of his Dictionary, using it as a mine of good surgical nomenclature. With Walter Harris, he inclines toward the doctrine of acidity. His patients must have enjoyed their ailment for he prescribed as a diet, "Mutton, Kid, Rabbit, Pullet, Chicken, Partridge, Pheasant, Cock Ec. and these roasted; . . . their Bread ought to be Wheat and well-baked, and their Drink medicated Ale or Beer; Wine is also allowed, but Water utterly forbidden." Living in the seventeenth century, we find him prescribing such favorite remedies of the period as earth worms, garden snails, goose grease, hog's lard and garlick.

His surgery is interspersed with gems. "Before you open them, you must endeavour at a perfect Concoction; for if you open them while any Part of the Gland is hard, it will increase and put you upon a necessity of eradicating it, or of leaving your Cure imperfect."

Such then is our "Full View of All the Diseases incident to Children." Harris, Boerhaave, Sylvius, Willis, Sydenham, Glisson and Wiseman. Well done!

The book closes with a good index.

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[Tailpiece from Erastus: Varia Opusculum Medica. Frankfurt-a-M., 1590.]

# THE FOUNDATIONS OF SCIENCE AND RELIGION IN DANTE'S DEBT TO ARISTOTLE

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ALTHOUGH a recent Italian reviewer in *Scientia* admits that the civilization of Europe had its rejuvenescence, in the first stages, from the darkness of the Middle Ages given it by Islam, he thinks this is grossly exaggerated and an unjust view as to the Italian Renaissance. This complaint from a patriot is perhaps to be viewed with lenity, but that the Italian Renaissance, properly defined, was a somewhat later and more complicated result of the infiltration of oriental thought, some three or four hundred years earlier, can scarcely be denied. As to the germination of philosophy and science in the Dugento and Trecento, the pre-Renaissance of learning, there certainly can be no doubt. At the time of the birth of Dante, at least by the time of the death of Saint Thomas (1274), if not directly due to criticisms and comments that arose among ecclesiastics both Christian and Mohammedan, it was true, nevertheless, that the philosophical thought of the pre-Renaissance was greatly stimulated. In this the name of Ibn Roschid or Averrhoes, as we know him, is preeminent. Through Averrhoes and the opposition in intellectual problems which he excited in Thomas Aquinas, Albertus Magnus and their followers, calling for a mental activity hitherto strange to the Middle Ages, this philosophical thought came into prominence. Through these men, Averrhoes, the Arabian, primarily stirred up a European antagonism and Aristotle came into his own again.

It has long been known to all those whose learning was sufficiently large to interest them in the history of thought that it was the Arab conquest of the southern fringe of Italy and of the better part of Spain for eight hundred years which began and spread culture, knowledge, science and refinement throughout the whole continent of Europe. So strong and so universal was the religious prejudice, especially following the crusades for many hundred years, that this historical fact was obscured and ignored by the historians of Europe. The reaction against this perverse lack of candor by Christian writers may be said to have begun before rather than after the first publication, in 1852, of Rénan's essay on Averrhoes.[1] The nephew then sat on the throne of France, but it was the great Napoleon who had carried the eagles and scientists of France to Egypt fifty years before. There the latter opened their eyes not only to the fancy that forty centuries looked down on them from the tops of the pyramids, but to the fact that somewhat less than a thousand years after the fall of Rome, the science, the literature and the culture of the Arabs had taken the place of the Roman and the Greek, at Alexandria. It cannot be doubted that they reflected on its introduction at that time into their own country, but it was Rénan who made it clear to the world. By the time (1258) the Mongols had shattered the power of the Arabs in their homeland and had sacked and burned Bagdad, the great awakening in Europe was under way, with which the Nestorians and the Jews had at their very start inoculated the fierce followers of the prophet.

It seems to have needed the brilliant exaggerations of Draper in 1864[2] to bring the fact fully home to the consciousness of the writers of European history for Rénan's far more temperate and evenly balanced and better authenticated research had to wait thirty years for its republication and expansion. By that time Draper's work and the work which it stimulated had made the era of Arabian science familiar, at least, to academic circles. Since then Berthelot, and in our day Holmyard and Sudhoff are only a few among many, who have illuminated the subject. It is not possible to go into this here, but as a consequence, perhaps, a Catholic priest in Spain has brought forward a topic less familiar to scientific men, yet in its implications quite as important and still more impressive than our present common knowledge of the rôle of Arabian science in the history of thought. It serves better in forcing on our minds the realization of how Arabian influence penetrated and permeated the minds of men of the Dugento in Italy. I am referring to the work of Miguel Asin.[3]

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[1] Rénan, E. Averrhoes et l'Averrhoisme. Essai historique. Calman-Levy, Paris, 1884.

[2] Draper, J. W. History of the Intellectual Development of Europe. Bell & Daldy, Lond., 1864, 2 vols.

Dante, as he says, was midway in life's journey when he set himself to write the "Commedia" and that point in the poet's life marks the termination of the Dugento. By 1300 the leaven of Islam had made far more than a beginning of its ultimately widespread influence on science and theology. Averrhoes had stirred the dead bones of scholasticism and ecclesiasticism into a life they had never known before without acquiring among his own people, or at least not for long, any paramount influence, but beyond the Pyrenees St. Thomas Aquinas and Albertus Magnus and a hundred lesser men sprang to the defense of what they considered the real tenets of the Christian Church. The great Commentator had misunderstood or misinterpreted Aristotle or deliberately lied about him and in science as well as in religion the fight was on which was the most potent factor in the cause of the spread of Islamic influence. Doubtless long before this the men of the pre-Renaissance, no doubt the men of the Middle Ages and the Dark Ages too, had absorbed Eastern tales which have nothing to do either with science or religion. As the crusaders failed to conquer the infidel in battle, the priesthood tried to convert them by gentler means and this opened another path to Arabian influence when these cowled men returned home unsuccessful, but even before this the eastern tales had drifted in. There was extant in the eleventh century a manuscript which was translated from the Sanskrit into what was then modern Greek; this was a collection of Hindu tales about animals that talked like men, which before this had played a considerable part in Persian and Arabian literature for hundreds of years before it came to the attention of Europeans who could read. These stories in the thirteenth century were translated first into Hebrew and then into Latin to make them accessible, however, this is a matter of slender historical interest to the modern ethnologist. Every continent has known the tales told by Aesop and La Fontaine and Uncle Remus. They may go back to the caveman but they spring spontaneously from all primitive men in contact with primitive nature. Our point of interest is the early entrance into a receptive primitive Europe of currents of thought and forms of expression, which were oriental.

These are the currents of other parts of the ocean of Arabian influence which encircled Europe before Renaissance days with its crescent, but this book of Asin's turns our attention to something else. Miguel Asin y Palacios is a professor of Arabic in the University of Madrid. He wrote a book some time ago on the "Mussulman Eschatology in the Divine Comedy." Stimulated and supported by the Duke of Berwick and Alva he has abbreviated and omitted his references and cut out the Arabic and other foreign texts and Mr. Harold Sunderland has translated it into English and the Duke of Alva has written an introduction and insists the work is of great value not only as an exposition of Islamism, but as proving the profound and unsuspected influence the latter had on the conceptions with which the "Commedia" has supplied Christianity for five hundred years. The historian of science will find matter of interest as supplementing what has been revealed to us on the way. Specifically it has, of late, developed that we do owe something more to the Arabs than as simple transmitters of culture, in the way of chemistry and possibly astronomy and in the matter of mathematics, it has been grudgingly granted by western science. It may be a personal note of my own, but their medical science is a tiresome travesty on that of Hippocrates and Galen and thus shamefully besmirched they handed it on to the Italian Renaissance to be cleansed of inanities and filth. Those well versed in ancient Greek medicine who have read most of the Arabian books in Latin have no illusions as to what they did to medicine after receiving it from Byzantium, at Bagdad, at the hands of the Nestorians and the Jews and on finding it at Alexandria. Those who have been led to expect to find hidden treasures in medicine, by the enthusiasm of Draper and persistently pore over the miserable tomes of Avicenna and Rhazes and Albucasis easily drift into something of the state of mind of Petrarch when he was confronted by Arabian physicians and their books at the papal court of Avignon.

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[3] Asin, M. Islam and the Divine Comedy. Tr. by Harold Sunderland. John Murray, Lond., 1926.

Petrarch had no feeling of reverence toward John XXII who is said to have seduced his sister, but for the Arabs he knew no bounds to his contempt. He cherished inheritors of ancient learning and he was outraged by the pretensions of the Arabian physicians at the court of Clement. He was disgusted at the foppery of their poetry and its vileness, but as to their medicine he fell into violent fits of humor whenever it came to his attention. He refused to be treated by any of their drugs, when sick, and he loathed their poetry. "I know their poets. One cannot imagine anything more mushy, more nerveless, more obscene." Someone had said their medicine was as good as that of Hippocrates and this threw Petrarch into convulsions of rage which he had to repress for fear of the pope. In four volumes of his letters, however, he pours out, upon them and upon doctors indiscriminately, for in his day they were all tarred with the same stick, the vials of his wrath and as Rénan remarks, he seems to have been half insane on the subject. I confess I understand and sympathize with him, but the point here is the indication we thus gain as to how much European medicine was a slave to Arabian ineptitudes.

Petrarch was born in 1304 and his father was a friend of Dante and exiled on that same fatal day of January twenty-seventh, 1302, when Florence drove out of her walls the greatest poet of Italy and the father of him next in rank. We may easily believe the pressure of Arabian learning was scarcely less heavy on these exiles than that which so infuriated Petracco's son fifty years later, whose library, Boccaccio said, contained texts of Aristotle and Plato, which he could not read in Greek. We may therefore be a little cautious about the righteousness of his wrath as we need not be astonished to find in Dante, Islamic ideas of Heaven and Hell. Rénan who immersed himself, for the best years of his life, in a study of Oriental literature gave it as his matured judgment that neither the Hebrew, the Arabian, nor the Semitic genius in general had any flair for philosophy or contributed anything original to it, but as to the regions of thought toward which Dante directed his genius, they were experts. Asia was the homestead of the religions which went forth to conquer the world. It is only with caution that Rénan gives his opinion that even in the time of Averrhoes the Arab philosophy had anything superior in it to that of the Christians for the Arabs quickly repudiated Averrhoes and persecuted him. He even thinks that the influence of the Arabic upon Christian theology is not perceptible until about the middle of the thirteenth century, as we have seen at Paris.

It has also been remarked that Petrarch had a very poor opinion of Arab poetry, but it seems clear that the Arabs very early, indeed during the crusades, had a profound influence on Provençal literature and the poetry of the troubadours. Dante was much attracted to it, so much so that in the "Purgatorio" he puts eight lines of it in that tongue by the mouth of Arnaut Daniel. Much of the collateral and circumstantial evidence, which I have only alluded to, our Spanish author, Asin, has left to one side without even an allusion and on the other hand he does not lay sufficient emphasis on the liability that legends, common to Islam and Christianity, would be pretty sure to arise among primitive people which would closely resemble one another because of a common origin in the Christian Gospel. Moreover very many poets, in the history of literature and religion, had led their heroes and their saints to Hell and even to Heaven and brought them back again to tell what all men wanted to know. When Dante went himself he had with him as guide Virgil who had sent Aeneas to Hades to interview his father, but Mahomet's visit to Heaven and Hell like that of Dante had their roots in the Book of Revelations and in the visions of the Apocalypse.

Jerusalem was the center of the earth for both by which entry and exit was made to regions of bliss and the confines of torture. It was the goal of God's trip with Mahomet and the center of Dante's "Paradiso" and "Purgatorio" when mapped on the earth's surface from above or below. A brief passage in the "Koran" did more for the Moslem legend and Revelations more for Dante, perhaps, than the "Aeneid," but he had that in mind too and he had no hesitation in alluding to it in making Virgil say:

> Or vo', che sappi che l'altra fiata
> che io discesi quaggiu nel basso Inferno . . .

No wandering exile in the stormy Italy of Dante's time, with the Inquisition a ready weapon for one's foes, however great a poet, would have ventured to avow he borrowed from the Saracen Infidel his idea of either Heaven or Hell. That was a serious proposition, but the tolerance for all things classical which had begun long before Dante's day allowed him to give the ancient philosophers a tolerable quarter in Hell, but Averrhoes, the "Grand Commentator" did not fare so well and Mahomet had a hot corner. Brunetto Latini, who for other and far viler practices he placed there too, was nevertheless Dante's teacher from whom he might well have learned much of the Spanish-Arabian religion and drunk deep thereby from their legendary literature.

It is Asin's task to let us see how parallel are the accounts we get from Dante and from the Islamic Ibn Arabi and other Arabian authors. After reading all his evidence and considering what he might have added, which I have above intimated, any assertion that Dante did not at least know the Mussulman's fantasy, before he gave shape to his own, is incredible. This once realized, it becomes impossible for the future historian of scientific thought, because of the implication, to ignore the testimony of the "Commedia," in any account, of the intellectual development of Europe and it is something we will not find mentioned in either the now old book by Draper or in that by Rénan. Yet Dante emerges from the Middle Ages as the embodiment, and the marrow, of its thought and the prophet of the Renaissance. The horror of Hell's punishments in both the Christian and the Islamic accounts, about which there are several letters, are so often identical, only one impression can be left on the candid reader, but this detracts in no way from Dante's poetical preeminence and his superiority over the Arabian sources, or Christian either, and we are still permitted to hold with Petrarch even as to this theological interest. Though the punishments of the Isra are not always so identical with the "Inferno" as to attract notice, the relativity of them to the sin of the guilty body organ or member or brand of transgression obtains in Mahomet's Hell as well as in Dante's.

In the "Miraj" or ascent to Heaven, the last stage is the revelation of the Throne of God to Mahomet in a blaze of glory. It is the same as to Dante, the general lines in both stories being strikingly similar, but in all these similarities the details which come out by a more careful study, than is here possible, are by far the most convincing. The seven heavens traversed by Mahomet are identical with those Dante names after the seven planets of the Ptolemaic system, but we need lay no stress on the number seven. That has been almost a universally magic number since Pythagoras. Although, for the instance in the "Inferno," Charon and Minos figure at the entrance of Hell somewhat as they do in the Hades of the "Aeneid," Dante, according to Asin, "merely reproduced the Moslem scene in a more artistic form."

Oriental sensuality, despite Petrarch's invectives, did not in many of the Islamic accounts prevent something closely resembling Dante's purified vision of Beatrice appearing. Though the common conception of Paradise by the infidels and of the Islamic Paradise by certain erotic Christians has always been a sensual one, this Catholic priest protests against the view that woman was regarded by the highest minds among the ancient Moslems simply as an agent for satisfying the lust of man's animal nature. They also exalted her as Dante did and if they did not raise her to the angelic throne of theology and to the eminence of the highest philosophy as Dante did, it was because they had no share in his immortal genius and because, after all, they belonged to an earlier era of world culture. However that may be, as I have said, the historian of western thought and the progress of science cannot fail to take account of this.

We have been made familiar, by Rénan and Draper, with the influence of Averrhoes and the other Arabs, of Thomas Aquinas and even of Ibn Arabi or Raymond Lull in Spain, where Brunetto Latini may have been indoctrinated, but that Ibn Arabi and the accounts he and others gave of Mahomet's visit to Heaven and Hell may have had marked influence on the "Commedia" of Dante is one of the things for the historian to remember as well.

In taking note of the science of Dante in order to see how much he as the representative of his times was imbued with the doctrines of the ancients and how much their thoughts were the thoughts of his contemporaries the scientific observer will often be chiefly attracted to the celestial physics or, if you will, to the infernal physics, but if to the former one quickly perceives[4] that God has entrusted the heavenly bodies to the guidance of the angels. This is following the scheme of Plato who makes the Supreme Being from behind a cloud of mystery deliver them over to the care of demiurgoi and disembodied souls. It was after 1221 but long before the birth of Dante that Michael Scot translated the "History of Animals" of Aristotle into Latin and long before it the "De Caelo"[5] had been translated, both from the Arabic, and many of the Arabian works for the Emperor Frederick II. In his great work on astrology Scot remarks that some say the planets are moved by angels, but he holds still more mystically that they are ruled by the divine virtues, spiritual and not corporeal and beyond this little can be said. It seems that Dante must have had this turn of thought in mind when he wrote[6] that though it is impossible for the human understanding to transcend the limits of mortality it is love which moves the heavens. While Frederick was having the Arabian works turned into Latin at his court in Sicily or Swabia, at Paris in 1210 the Pope had forbidden the works of Aristotle to be used in the University.

As has been said, Averrhoes died in 1198 or perhaps a few years later, but when his "Commentaries on Aristotle" became known at Paris their perusal could not be long checked by any decree so sweeping, promulgated so soon after his death. It was not only the intuitive analytical turn of his mind but his wit and biting sarcasm, always highly prized by the Gauls, which ensured them a reception, the tomes of the schoolmen never received. He wielded a double edged sword which wounded his countrymen as well as the foreigner, his friends as well as his foes. He remarked on the Semitic prejudice against pork with the comment, "such an injunction can meet only the approval of a hog."[7] The career of a sage, exciting quarrels among Christians and cutting the ground of his defenders, Moslem and Jew alike, from under their feet, we may easily understand was a stormy and a disastrous one for him personally. It was the war he set up among the Christian ecclesiastics which introduced or rather rooted the knowledge of Aristotle in the consciousness of the Dugento. The ambiguities of the Greek text were sufficient, but the Arabian mutilations were more than sufficient to set all Christendom by the ears, when it was found in the comments of the Arabian that the tenets of scientific works no less than those of esoteric contemplation narrowly pressed on the dogmas of the church. Even the particularities of the life of Aristotle were grotesquely distorted. A good example may be found of this in Dante's first great commentator, some sixty or seventy years after his death. Boccaccio must have had what he reported[8] of Aristotle from much the same sources as Dante, as to his life and these must have led both the poet and the expositor much astray, but one may as well perceive by the legends of Aristotle which Mulvaney discusses[9] it has needed the long and laborious research of many modern commentators by means of historical and archeological facts, which have come to light since the time of Boccaccio, to weed out a consistent account of Aristotle's life and of the contemporaries with whom he came into contact.

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[4] Inferno VII, 4.

[5] Thorndike, L. A History of Magic and Experimental Science. Macmillan Co., N. Y. 1923, 2 vols.

[6] Paradiso I, 74.

Aristotle's works after his death until after the Renaissance in Europe had almost romantic vicissitudes. We need not wonder, if what Strabo tells us is true, that commentators have been baffled and critics have quarreled over the texts. According to the will of Aristotle, as reported by Strabo[10] he left his books to Theophrastus, and Neleus having attended the lectures of both inherited from Theophrastus both their libraries. Neleus took the books to Skepsis, an interior town of the Troad, where his heirs stored them in a damp cellar and the mould and the moths wrought havoc with them. They were, after years, sold to Apellikon and he had them recopied and the damaged places in the text filled in according to the fancy and judgment of careless copyists. I do not understand that this refers only to the books which Aristotle and Theophrastus wrote but to others also which they possessed. Neither is it at all sure there were not other copies extant. At any rate the resulting texts of the new edition at Rome in the last days of Cicero could not have been above suspicion when centuries later, this doubt being unresolved, the Nestorians and the Jews translated them according to their fancy and judgment for the Arabians. Averrhoes must have been a grand commentator indeed to have made what he did out of the hodge podge, for he understood no Greek.

"Not long ago," says Boccaccio, "I saw all (the works of Aristotle) or the larger part of them or the most notable of them written in the Greek language in a large volume in the possession of my venerated master, Messer Francesco Petrarca. It is a fact that the science of this most famous poet philosopher for a long time remained hidden under a cloud of envious fortune, but in marvelous fashion preserving for worthy men the science of Plato, nor is it doubtful that but for the coming of Averrhoes it would have remained under the same cloud. It was he, if what I have heard is true, who first dissipated the cloud and made his light appear and caused it to be valued to such an extent that today scarcely any other philosophy than his is followed." It was only five years after the interdiction in Paris that Innocent III, in 1215, issued less prohibitive instruction to the schools of Paris, permitting the study of the dialectics of Aristotle, but forbidding his "Physics" and his "Metaphysics" and the commentaries on them. These had come in through the Arabians, but even they were more or less tolerated by subsequent popes.

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[7] Draper, J. W. History of the Intellectual Development of Europe. Lond., 1864, 2 vols.

[8] Commento di Giovanni Boccaccio sopra la Commedia. Firenze, 1895, 2 vols.

[9] *Classical Quarterly* July-Oct. 1926 34 p. 155.

[10] XIII, i, 54.

The Arabs had started out in the seventh and eighth centuries with all the learning, or as much of it as they were capable of carrying, which had been in the possession of the Syrians, Nabateans, Harranians and Sassanid Persians, according to Rénan.[11] They had to accept Aristotle as the recognized authority but they took no lead in doing so. Although Rénan insists that temperamentally the Arab genius was antipathetic to philosophy, yet it was the rather singular fate of Averrhoes to gather fame in the land of his racial foes and punishment and exile from those who supported most effectively the Moslem power in Spain and Africa. It was the Arabian flair for astrology and alchemy which formed the bridgehead of the intellectual onslaught of Arabian civilization in Europe. Strangely mixed with their astrology were traces of the "De Caelo" of Aristotle, modified by the Ptolemaic astronomy in the time of Pope Sylvanus II (999 A.D.). Their astronomy they may indeed have had from a Greek inheritance, but their chemistry has baffled modern investigators of its origin. It has been suggested that the Arabs derived their alchemy from a Moslem mission sent as early as 628 A.D. to Pekin, four years before the death of Mahomet, but they may have derived it equally well from India, for, as Ray[12] has pointed out, "It is of interest to note the alchemical notions which had gathered around gold and lead at the time of the 'Atharva Veda.'"

Although Aristotle had been translated into Arabic three centuries before Averrhoes, it was mostly done by Syrians. No Mussulman savant, certainly no Spanish Arab knew Greek and in this Averrhoes knew no more than his brother savants, but in him he had what they did not have. He had the critical faculty in himself though he had nothing of Aristotle to read but the ancient versions made from the Syriac by others. The Greek text was a closed book to him, but he regarded its author as divine and modern scholars have been astonished that with all the sources of error to which he was exposed he should have penetrated the meaning of the "Stagyrite" so deeply and accurately as he did. The only books of Aristotle upon which there remains no commentary of Averrhoes are the "History of Animals" and the "Politics." Grossteste knew as perhaps Roger Bacon did in some way enough of the Greek text to realize that the Arabian versions were corrupt and often grossly erroneous and the language of the translation very far indeed from the Greek conciseness. Under the devastating hand of the great Cardinal Ximenes, Archbishop of Toledo 80,000 (Rénan) Arabian manuscripts are said to have been given to the flames in the open spaces of Grenada and if the old critics were right it was not a loss as large as the figures would intimate.

As we have seen, only cautiously does Rénan admit that the philosophy of the Arabs in the decades which followed the death of Frederick II, seems superior to the European. It is demonstrable however in the works of Averrhoes in the boldness and penetration with which he analyzed the great problems of peripateticism, many of which are encased in the crystal of Dante's "Commedia." Very early, a generation at least before Dante arrived at the famed middle point of his life,

> nel mezzo del cammin di nostra vita,

there were schools of philosophy among the

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[11] Renan, E. Averroes et l'Averroisme 4 ed., Paris, Levy, 1882.

[12] Ray, P. C. History of Hindu Chemistry. London, 1902, 2 vols.

Christians who agreed that generation is only a transmutation of substance, a tenet of Aristole with which we can also agree, it seems to me, better as modern philosophers than as fundamentalists. Averrhoes, who does not follow this view to its logical conclusion in his commentary on the twelfth book of the "Metaphysics," Rénan declares, says that there were men of his religion also who create things out of nothing. Aristotle we often find, in this sense, that of transmutation, declaring for spontaneous generation, but here we find the Arab using him against those who believed in the transmutation of the non-living into the living. In the ultimate analysis however the evolutionary philosopher has to grant the fundamentalist there was a time when that took place, at a time perhaps when no modern biologist had been born to jeer at abiogenesis. The account in Genesis is a matter of detail we ought to feel at liberty to disagree about. Rénan thinks that Averrhoes slurs this dilemma over, but he lays emphasis upon an assertion he finds, perhaps here in the "Metaphysics," made by Aristotle, that God does not concern Himself with the special but with the general. This is apt to find expression more frequently from minds of insufficient caliber to deal even with details and we may well believe much of Aristotle's thought was twisted into sentiments, agreeable to the minds of critics, to take this form, for no one antedated Aristotle or has excelled him in the pains he gives to objective details in biology. From Strabo to Buffon however we find mere man frequently boasting he resembles God in that. Aristotle when he comes to deal with the beginnings of life does wrap it up in vagaries of general philosophy like that of transmutation, which in this case is an evasion, and which Averrhoes slurs over. What is life remains the enigma of science. It was Aristotle who gave birth to the observation which modern evolutionary science has taken up as one of its own. God is wasteful of the individual life, but careful of the species. Through St. Thomas it is said Dante gets the illustration of this principle and gives us a description of animal generation in the "Purgatorio,"[13] in which the "flower of the blood" guarded with the sperm furnishes seed for the future birth of a new life.

There certainly seems no basis in Aristotle for the conclusion that it involves the assumption that God created the angels in the morning and left them to do the rest. It is from Plato's "Timaeus" such an inference is possible, but it is a further example of the Averrhoistic cutting to the core of a problem in criticism, which set the teeth of the popes and of all the monks in Christendom before Dante, on edge. It probably no less embittered the Moslems, for the Koran too admits this interpretation, which by the way, is a part of the Hundu's Brahmanistic criticism. They had long since seen this conception of a faineant God and bothered no more about it. When the modern scientist identifies his God with the immutable Law of Nature he is up against the same disconcerting point of view. The scientist escapes it no more easily than the theologian, but he has emphasized it of late in making us realize there is a universal physical law which governs the intraatomic orbits as well, alike with the heavenly. Dean Inge is right, science holds out no alluring prospects to the conventional church. Dante in his exposition of Free Will and Predestination, the ancients with their goddess Necessity make very thin ice to skate over, but Dante patches out Aristotle with the glamour of his genius in a way that makes us forget the path Averrhoes hewed to the center of the question which ended in nowhere.

It needed no great nicety or precision in the acceptation of the text of Aristotle, to which Vincent of Beauvais is said by Thorndike to have pretended, to make the learned even of his day (1250) understand that the conflict is irrepressible in the terms of faith and reason as then understood and as even now advanced. The immutable Law of Nature is a conception fundamentally at variance with that of an ever watchful Providence. Why watch? It was the very dust and turmoil the corruption of texts raised in the pre-Renaissance, which hid the crux of the real question to which Averrhoes cut his way. His contemporaries gabbled about scholia and erasures, but he saw the general problem above the details of the text. He was the Grand Commentator, and a lonely figure he was. Though Dante repeatedly broaches the question of Free Will and Predestination and makes it no clearer than his predecessors and successors he cuts loose from Aristotle's difficulties as to the immortality of the soul and develops the Neoplatonic Pythagorean conception of it as I have attempted to show elsewhere.[14] Rénan, like most commentators appreciates the fact that in the third book of the "De Anima" Aristotle has not expressed himself clearly on the subject. Averrhoes took the very natural view, it seems to me from this discourse of Aristotle, that the individual soul perishes with the individual body. The entelecheia is a teleological agent, but it does not extend its business beyond the body. It was this, I suppose, won Averrhoes a warm place in Dante's "Inferno,"[15] not however with Mahomet[16] in a very uncomfortable situation, but in the best of heathen society with "those who know." He had it from Aristotle who stood there at the head of the family of philosophy, among them Anaxagoras upon whose "nous" the "De Anima" is largely based, but why in the latter we get no liason with the world soul of Anaxagoras has never been made clear from the contradictory theses Aristotle is credited with. This ambiguity evidently did not lend itself to the active constructive poetical faculty of Dante, whose whole structure of the "Paradiso" rests upon the active participation of the Divine Intelligence, symbolized or indeed actually identified with Light.

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[13] xxv, 37 seq.

In contradistinction to the clear cut but highly poetical and idealistic conception of Dante I may be permitted to translate Rénan's view of the Aristotelian difficulties which beset the Averrhoistic disputants:

> No doubt in translating into modern language the theory of intellect exposed in the third book of the "de Anima" and in freeing it from the too substantial forms of the Aristotelian style, we arrive at a theory of consciousness analogous enough to that which received the assent of the philosophic thought at the beginning of the ninteenth century. We need only interpret Aristotle to the effect that two things are necessary for the intellectual act, first, an impression received from without by the thinking subject and second, the reaction of the thinking subject to the sensation received. Sensation gives the matter of the thought, the "nous" or pure reason gives the form.

This appeals to us at once as near our own intellectual boundaries, but the question for the medieval mind was far from simple and far nearer the subtleties of the ancient thought.

> In short the peripatetic theory of the intellect, such as it came out of the analyses of the commentators is made up of five theorems:
>
> First. There is a distinction of two intellects, the active and the passive.
>
> Second. There is the incorruptibility of one and the corruptibility of the other.
>
> Third. The active intellect conceived as outside of man, like the Sun of Intelligences.
>
> Fourth. The unity of the active intellect.
>
> Fifth. The identity of the active intellect with the last mundane intelligences.

As may be seen this scheme starts off in an appealing way, but the modern reader fails to find the place where he should capitalize the intellects into a divine essence and Rénan makes the commentators responsible for this confusion, but Aristotle himself in criticizing Plato denies that immortality can have any liason with mortality however elsewhere he assumes that it has such liason.

Suffice it to say this was no sort of a complex for a poet like Dante to trim his wings for. He swings clear of it into the ethereal brilliance of Pythagorean idealism and indeed at the time the followers of Aristotle did not pay much attention to this third book of the "De Anima." For them the soul was the echo of the organism of the body, but Alexander of Aphrodisias had made much of it in the decay of the last stage of Greek philosophy and with this the Arabs were inoculated. Modern critics are now suggesting the trouble in Aristotle hangs about the word he uses for separate and separable. Certainly Aristotle looked on birth and death, on coming to be and passing away, as mere change rather than separation, but into that quagmire we do not have to venture, for Dante threw himself as a Dominican, and he could do no less as a Christian, bodily into the camp of Aquinas, the champion of the Church as to the immortality of the soul and of much else, but ever the tireless and victorious, so far as Christianity was concerned, opponent of Averrhoes. The Franciscans at Paris, like Alexander of Hales and John of Rochelle, supported him at their peril. In this wordy contest the new ideas fermented which introduced the Renaissance and despite the denunciations of the victorious Dominicans, the upshot of it was that within a generation or two the pagan Aristotle and the infidel Averrhoes were universally regarded as grave authorities on the subject of the Christian theories of the soul until the Renaissance swung away from them to a sort of bastard Platonism which took little account of Christian doctrine.

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[14] *The Open Court*. May, 1927.

[15] Inferno IV, 144.

[16] Inferno 28–31 seq.

Averrhoism in the time of Petrarch was the fashion in Venice and Petrarch declares that when he was there in his old age they tried to convert him to it. According to Rénan it only elicited from him a book on his own and other people's ignorance.

> They adore Aristotle without understanding him. They reject Christ. They seek the light by turning their backs to the sun. Ye gods, they walk the streets arguing about beasts like beasts.

But Venice was where the books were printed which kept the popes busy putting them on the index while cardinals held stock in the very profitable output when the new trade of printing sprang up. It was near by, at Padua especially, that Averrhoes reigned, but all this was long after Dante's day and Petrarch was "the first modern man." When the Greek texts came into Italy after the fall of Constantinople another day had dawned and when, in 1497, Nicholas Leonicus Thomaeus took the chair at Padua to teach Aristotle from the Greek, Cardinal Bembo celebrated the occasion in verse, but still the discussion goes on about the texts of Aristotle.

Two hundred years before this Dante had had to depend on the Arabians and the criticisms of St. Thomas for his cosmology, and there were some even then who took unquestioningly the cosmology of Averrhoes. Dante accepted, however arrived at, the cosmology of Ptolemy where it did not interfere with his theology. Though he, as a good Dominican, rejected or was silent as to the heresies of Averrhoes, the first sentence of the "Convivio" quotes the first sentence of Aristotle's "Metaphysics," all men are by nature desirous of knowledge, and he surmises it is because providence has arranged it so that each step gained in knowledge tends to the perfection of man which in the last analysis tells for his felicity. This is the doctrine, Socrates taught Plato and from him doubtless Aristotle had it, but it has found doubters in our day since the great war. Dante's worst aberration was the aberration of his day. It can scarcely be denied that though he consigned[17] Bonatti, the great astrologer, who had flourished before him, to Hell, he had more than a half belief in the mummeries of astrology. We fail to realize in our study of the history of medicine how much astrology occupied the thoughts and furnished the theories for medical men at this time. In the "Convivio"[18] we get the drift of Dante's thought to it through physical laws which he dimly sees. It is astonishing that a mind like

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[17] Inferno xx, 118.

[18] II, XIV.

Dante's should entertain even the similitude of such nonsense, even though his environment was steeped in it. It is interesting to note in his remarks on the Milky Way, which Pythagoras is credited with imagining is the footprints of souls departing to their homes in the sky, that he finds difficulty in finding out what Aristotle thought, for in one translation it is given one way and in another another way. The new one says the Milky Way is a vapor and the old translation says it is a number of fixed stars. The old translation, it is thought, was one of the Latin translations of the Arabian version and the other is the one furnished by St. Thomas and made directly from the Greek. That, if from the "Meteorologica"[19] is certainly Aristotle's meaning as we now have the text, but he reports the opinion of Anaxagoras to the effect that the Milky Way is made up of innumerable small stars. I believe modern astronomy now says both opinions have their justification. However Dante[20] has from Albertus Magnus his knowledge of Democritus and Anaxagoras and we may surmise he has the information as to Aristotle's opinion from the same source and Thorndike[21] expresses strong doubt if Aquinas ever translated anything from the Greek, though he may have had something to do with getting the work done by others.

Dante was familiar with the idea ascribed to Pythagoras by Aristotle that the earth and its antichthon are stars fixed opposite one another in a sphere that revolves around a central fire from west to east[22] but he says Plato in the "Timaeus" wrote that the earth with the sea was the center of everything, but turned around its own axis. This was contradicted "by that glorious philosopher to whom nature opened all her secrets." As a matter of fact Aristotle, in the "De Caelo,"[23] gives a meaning to the passage in the "Timaeus" to which modern scholars have not all been able to acquiesce. Though it seems presumptuous for these modern critics to quarrel with Aristotle about such a thing, as he had opportunity of personal converse with Plato to convince him, Aristotle gets very much involved and Dante has some reason to grope and disclaim his ability to compete with the "glorious philosopher" in exposition of the heavenly phenomena, but he ventures far enough to say:

> The heavens continually revolve around this center (of the earth and sea) as we can observe. In this gyration necessarily there must be two fixed poles and a circle equally distant from them, which turns most swiftly. Of these two poles one is plainly revealed to all the world, that is the northern one. The other is hidden, as it were, from all the known parts of the earth, that is the south pole . . . If a stone should fall from our pole it would fall out in the ocean at a point on the surface of that sea where, were it a man, the star would always be over his head and I believe that from Rome to that point going in a straight line is a distance of about 2600 miles more or less.

From there to a corresponding latitude in the southern hemisphere is 7500 miles more or less, but here Dante becomes obscure though it appears to me by this kind of calculation he makes the circuit of the earth about 25,000 miles. If this is so and it is of Ptolemaic derivation it is surprisingly close, but he declares himself guided by the opinions of Astrologers (which we can translate astronomers if desirable) and Albertus Magnus and the testimony of the ninth book of Lucan. He ought to have learned something from Marco Polo, who had seen the Southern Cross, but just how that stone would obey the law of gravitation it is hard to say.

There is probably not much of this traceable to Aristotle, but elsewhere in the "Convivio"[24] he refers to his conviction that so divine was the nature of Aristotle's mind he and his followers, the peripatetics, quite eclipsed the glories of the Academy in moral philosophy. In an earlier passage[25] he attempts to give an allegorical or symbolic moral meaning to the facts of astronomic physics which he appears to think originated with Aristotle.

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[19] 338b, 22 seq.

[20] II, XIV, 36.

[21] II, 599.

[22] Convivio III, v, 17.

[23] 293b, 30.

[24] IV, vi, 86.

> By the pole, which we see, is meant the sensible things, of which, taking them as a whole, Physics treats and by the pole which we do not see, is meant the immaterial things, which are not sensible and of which Metaphysics treats and this heaven has a great similitude with one science and the other.

When Aristotle once became immersed in the astronomy of Eudoxus and Calippus he found his Unmoved Mover unadapted to the mechanics of this world, but in the vagaries of the later so-called philosophers of the Middle Ages and in the genius of Dante's imagination was found a reception which the men of Aristotle's own time did not render his cosmology. He became so involved in the intricacies of it that according to Jaeger[26] it broke his heart to find he could not make it conform to observable facts, but that did not bother Dante, he made the "Metaphysics" support the "Physics."

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[25] II, XIV, 56.

[26] Aristoteles, 1923.

# THE EVOLUTION OF OUR "TABLE"

### *By* CECIL STRIKER, M.D.

CINCINNATI

IN as much as one of the prime instincts of man is self-preservation, the evolution and development of man has revolved about the question of obtaining food. When we read about the early migratory races, we marvel at their wander-lust and, in view of this, consider them a shiftless, ambitionless group. However on more critical inspection we find that migration was only a means to an end, namely the obtaining of food.

There are two rather common quotations from which we derive a great deal of amusement: "Does man eat to live or live to eat," and "tell me what thou eatest and I will tell thee what thou art." It would seem that an entertaining paper could be developed around these two quotations. In the first part of the paper I shall try to give you scientific data, to show how our modern dietary régime has evolved, and in the latter I shall relate many disconnected but interesting bits of knowledge concerning our past food habits.

In so far as the diet is concerned the Mammalia may be divided into three classes; the Carnivora, the Herbivora, and the Frugivora. As the name implies the Carnivora are the flesh eaters, the Herbivora are animals which maintain life on leaves, grass etc., that is horses, cows and their kind, whereas the Frugivora are animals which eat both meat and vegetables, as man, squirrels, apes, rats.

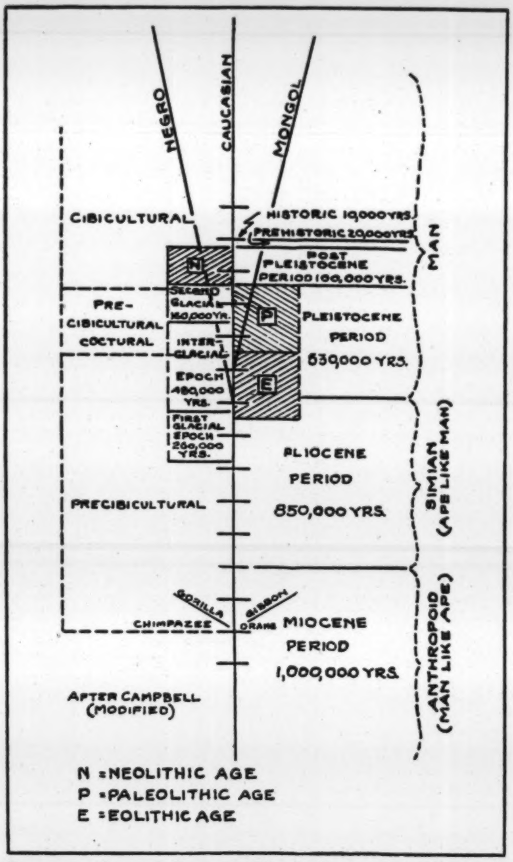
Before going into the types of food consumed at the various periods of evolution, it might be worth while to review the evolutionary scale upon which man has ascended.

While man was beginning his struggle upward from the ape; a vast continent stretched from India to Africa; the Pacific Islands collectively known as Polynesia represent the remains of what was then a vast continent; the region of the Sahara Desert was some 2000 feet higher than it is now, and was watered by many great rivers, and Asia was united to America in the region of the Behring Strait.

Man's dietetic career can be divided into fairly definite periods;[1] the precoctural or cooking period, dating from the anthropoid period to the early hunting period; the precibicultural [relating to food culture] coctural period, from the discovery of cooking to the introduction of agriculture and animals for food: the cibicultural, from the time of interest in cultivation until the present time.

In early times, seeds constituted the most important source of the vegetable food of man. Containing as they do an embryo plant besides starch and fat, they contained a small amount of protein. Some like the grass seeds require to be collected in large quantities, while others like acorns, chestnuts, palms and leguminous plants yield a good store. Wild fruits did not contain much nourishment but were rich in watery solutions of sugars and salts. The "fleshy roots," tubers or rhizomes contained much nourishment for they had much starch. Contrasting the uncultivated vegetable foods with the corresponding vegetable foods, we find the former differ from the latter chiefly in containing a larger proportion and a denser kind of cellulose and in being less palatable because of the bitter and acrid principles. As for the animal food of evolving man, it may safely be said that animal food in any or every form was acceptable to him. Some kinds would naturally be preferred before others but there can be no doubt that at any rate in times of dearth all kinds were greedily eaten, from fish, birds and bird eggs, and every species of mammal down to worms, snails, insects, caterpillars, lizards, snakes and shellfish.

In the anthropoid period there is every reason to believe that our precursors resembled present-day anthropoids and probably subsisted on much the same kind of diet as do the latter. The homo simian period shows the simian prehuman subsisting on mainly raw vegetables but making some attempts at eating animal food; however, only getting the smaller animals because of lack of efficient weapons.


NEGRO
CAUCASIAN
MONGOL
CIBICULTURAL
HISTORIC 10,000 YRS.
PREHISTORIC 20,000 YRS.
MAN
POST PLEISTOCENE PERIOD 100,000 YRS.
N
SECOND GLACIAL 160,000 YR.
PRE-CIBICULTURAL COCTURAL
P
PLEISTOCENE PERIOD 630,000 YRS.
INTER-GLACIAL EPOCH 480,000 YRS.
E
FIRST GLACIAL EPOCH 260,000 YRS.
PLIOCENE PERIOD 850,000 YRS.
PRECIBICULTURAL
SIMIAN (APE LIKE MAN)
GORILLA
GIBBON
CHIMPAZEE
ORANG
MIOCENE PERIOD 1,000,000 YRS.
ANTHROPOID (MAN LIKE APE)
AFTER CAMPBELL (MODIFIED)
N = NEOLITHIC AGE
P = PALEOLITHIC AGE
E = EOLITHIC AGE

Evolution Ladder Showing Man's Ascent from Ape and Various Dietary Epochs. (Modified after Campbell.)

The precoctural hunting and fishing period began when the evolving organisms developed hunting weapons, and they withdrew from a vegetarian régime and became "animalized." Coincident with this, salivary digestion diminished and gastric digestion became predominant.[1] As you know the starchy foods were broken down in mastication.

The precibicultural coctural period brought in cookery and probably man applied cookery to vegetables rather than to animals at this period. With the discovery of cookery the next great dietetic advance was made; the artificial production of food by the cultivation of plants and the breeding of animals. It is conceivable that breeding of animals might have come into vogue but agriculture would have been retarded, since most of the important articles such as cereals and roots need cookery.

The cibicultural age began about eighty to one hundred thousand years ago. One of the first advances in the direction of food culture was the storage of supplies to provide against scanty seasons; a second was the preservation and protection of plants valuable as food. Man also learned to store animal food by drying and smoking.

Flint implements, artificially fractured by fire have been found in the Miocene strata of Thenay, of one million years ago. The fact that fire has been so long utilized is sufficient proof of the antiquity of cookery, for there can be little doubt that to cook food was one of the earliest uses to which fire was put. But it was not until the Simian period that cookery was used consistently in the preparation of foods. The simplest method of cooking was by direct exposure of food to the fire, either by placing it actually upon the fire or by cooking it in hot embers. Another method was to wrap the article to be cooked in leaves. In the early life, the cooking of animal food simply consisted in throwing the carcass into the fire and while one portion charred, the other remained raw.

The first great advance in cookery occurred when underground ovens were employed. We feel that our present-day "fireless cooker" is a very ingenious apparatus; however as far back as the paleolithic era [three hundred to five hundred thousand years] "stone baking" was employed. This consisted in digging a hole in the ground placing stones therein and building a fire above them.[1] The stones were heated and removed with wooden tongs. Then the article to be cooked and the stones were placed on alternate levels in the hole. This took a while and usually the food was put in at night to be consumed the following morning. The next great discovery occurred when man discovered how to boil water. This came after stone baking and some of the present Australian natives are still unable to boil water.

The drink of primitive man consisted of water obtained from pools, lakes or streams. They did not appear to dig wells, because of their nomadic nature. Precibicultural man drank by leaning down to the water's edge, after the manner of cattle, or he may have used his hands as a cup. He also had some insight into the therapeutic value of water. The Australians imbibed large quantities of it for dyspepsia. Blood and liquid fat may also be reckoned among the drinks of the precibiculturists: the bushmen drank the liquid fat of the hippopotamus. They were ignorant of the making of alcohol. Alcohol was not discovered until man reached the agricultural stage,[6] which is the latest in the evolutionary scale.

It may be interesting to relate the quantity of food that some of the primitive people consumed. It is stated that five bushmen devoured a whole zebra in a few hours,[5] a Feugian ate twenty-four pounds of meat at one sitting.

A few scattered bits of interesting information concerning the diets and foods of different peoples will now be outlined. This is not given in chronological order as all sources of information are so scattered.

Though forbidden to the Jews by the Mosaic law, the Greeks ate pig in the heroic ages, and before the advance of luxury had given birth to the professional butchers, the warriors of Homer killed, dressed and devoured their own pork. At one period the Roman butchers sold meat by mication,[8] in the following way; the buyer shut one of his hands; the seller did the same, each of them suddenly opened the whole or a few of his fingers. If they were even on each side the seller had the price he asked, if they were odd the buyer gave the price he offered. The Romans were especially a pig-eating race, and retained their fondness for pork from the foundation to the fall of their empire. Neither the Phoenicians, Indians nor Mohammedans would eat pork.

For a long time it was thought by ancients a sin to eat the flesh of the ox. Moses places the ox in the first rank of animals whose flesh is allowed to be eaten. Hippocrates praised ox-flesh as nutritious but thinks it indigestible. Among the early Romans the ox was so precious that a citizen was banished for killing one, even if it were his own property.

In the old times the Egyptians hatched chickens in ovens. As for ducks Plutarch always gave them to his family when any of them were ill and Mithridates was accustomed to mix the flesh of ducks with all he ate as an antidote against poisons, which he feared. The more wealthy Romans only offered their guests the breast and head, returning the remainder to the kitchen.

The goose had its praise sung by Homer and it was a favorite dish of the Egyptian monarchs. A sentiment of gratitude endeared them to the Romans as by their noisy clamor they had formerly saved the capitol and they were reared both in town and country to guard the house. The most luxurious eaters of the Roman Empire valued only the livers of geese and by a fattening process, increased the size until the liver often weighed two pounds. This feat was paralleled by a queen of France who spent sixty pounds sterling in fattening three geese, whose livers she wished to render more than usually delicate. The taste for this delicacy was illustrated by an epicure, who prayed that he might have a throat as long as the stork's, in order the better to enjoy such a delicious food.

With the Romans the love of fish became

a mania. There was a barbarous refinement that the Romans not infrequently did at the banquet table. The fish alive but with its scales removed was placed on the table in a glass vessel, beneath which was placed a flame the object was to allow the guests to regale themselves with observing the gradations of pink colors, through which the fish passed until it was at once dead and cooked.[3]

Hippocrates held boiled cabbage and salt to be a specific cure for colic. Cato affirms that this plant infallibly cures all diseases. It is to the use the Romans made of it, he adds, that they were able during six hundred years to do without the assistance of physicians, whom they had expelled from their territories. Some looked upon horse-radish as a panacea. Young Athenian mothers ate it, when nursing their infants for the supposed benefit of the progeny. A mixture of onions and honey when swallowed on a fasting stomach was considered the best preserver of health.[3] The onions were giant size but could not compare with what is asserted of Judean radishes, namely that foxes could litter in the hollow of them and that they weighed a hundred pounds. They were used as projectiles by the mob. After they knocked down their victims and the fight was over they would boil their weapons [radishes] and eat them with vinegar.

Eggs were fashionable in Rome. Livia kept one in her bosom till it hatched; when a cock-chick appeared she divined that she was about to present her husband with a male heir. The birth of Tiberius proved her worth as a diviner. The Egyptian method of cooking eggs without fire was very interesting. The shepherds of Egypt placed them in a sling which they turned so rapidly that the friction of the air heated them to the exact point required for use.

Bread and milk gives us now but a simple idea of a simple yet wholesome diet. It was used, however, for other purposes than food in the Roman days. Roman "exquisites" of either sex rubbed their faces with a mixture of bread and milk in order to make their complexion fair. Milk baths too were more common with the Romans than with the French in the days of Louis xv. Five hundred asses supplied the milk for the daily bath of the Empress Poppoeia. Milk was prescribed for enervated kings and forthwith all the nobility took to imbibing asses milk as a symbol of their loyalty. For five centuries after the foundation of Rome the art of bread making, as we know it, was unknown.

Maimonides[7] said that the best meat of four-legged creatures is that of a fat sucking kid, next comes that of fat sucking veal; lamb is juicy. As for meat of the other four-legged animals, I should advise anyone who wishes to produce in himself the best of chyme to steer clear of them. Testicles contain filth, but the testicles of fattened roosters are very sweet and good eating. Any sort of brain [sweetbread] harms the stomach. Wine with equal quantity of water warms the whole body and makes the limbs move with more suppleness. The worst of all waters is that which is the residue of ice or snow. Milk is more nourishing than wheat. Almost all fruits of trees with few exceptions if eaten with their leaves [fresh] when they are well-digested do not give rise to bad chyme. Olives strengthen the stomach, stir up the appetite. The most weakening foods are green vegetables and most of the fruits which are surrounded by a thick shell. They are difficult to digest and they weaken the body. Whoever likes them, shortens his life.

Coming now to relatively more recent times, a short sketch of the food habits of some of the Eskimo Races will be given. Eskimos do not have a dainty palate.[1] Choice dishes are a bowl of coagulated blood, mashed cranberries with rancid train oil [whale fat], whortle berries and walrus blubber, venison steeped in seal oil, raw deer's liver cut in small pieces and mixed with the warm half-digested contents of the animal's stomach; bowls of live maggots, a draught of warm blood from a newly killed animal. Meats are kept in seal-skin bags for over a year, decomposing but never becoming too rancid for our Eskimos. It is a singular fact that in the coldest climate inhabited by man fire is less used than anywhere else in the world, equatorial region perhaps excepted. Heat is supplied by raw food and fur clothing.

Having dealt with food evolution and food habits, I will now give a very brief survey of feeding hours and implements. The idea of breakfast in historic times did not usually correspond in the least to what we now understand by the word. The original sense of the word was to unfast or break-fast for the main meal which was eaten at ten o'clock or decimen-diner-dinner. It may be worth while mentioning here that the now familiar sandwich gets its name from the fourth Earl of Sandwich [died 1792] who, being a confirmed gambler, invented it in order to remain at the gambling table without interruption.[4]

The fork formerly was two pronged. Men used to bring their own knives to the dining table. The dinner fork was not commonly introduced in England until 1608 when Thomas Coryat observed it in Italy. At first he was much laughed at, the novelty being described by one person as "as insult to Providence, Who had given us fingers."

The salt-cellar in early days was one of the most important things on the table, because the station of the guest was indicated by offering him a seat "above" or "below the salt." The most significant fact however, connected with the use of food by our ancestors is that our modern titles of lord and lady are founded upon the Saxon name for loaf. The word lord originally stood for "loaf ward" and had the meaning of loaf keeper, while lady meant "loaf kneader."[4]

Finally, one can get an idea of the cost of some of the royal banquets of comparatively recent times. In France[3] in 1824 at the coronation of Charles x the banquet cost one million dollars. In 1746 the Earl of Warwick gave a banquet which would be memorable for many things, but I shall only describe the famous punch concoction. The bowl was the marble basin in a delightful garden, forming the central point of four vast avenues, bordered with orange and lemon trees. A magnificent collation was served on four immense tables which occupied the whole of the several avenues. The basin had been filled with four large barrels of brandy, eight barrels of filtered water, twenty-five thousand citrons, eighty pints of lemon juice, thirteen hundred weight of sugar, five pounds of nutmeg, three hundred biscuits and a pipe of malaga wine. An awning over the basin protected it from the rain. In the beverage was a charming little rosewood boat, a cabin boy, belonging to the fleet, rowed about the surface of the punch ready to serve the joyous crowd, which numbered more than six thousand persons.

In conclusion one can see that "Our Table" has gone through an evolutionary development, hand in hand with the evolution of man. Man's nutritional needs and digestive mechanisms have changed with the artificializing of foods.

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*I am indebted to Dr. S. B. Feinsinger, The Hebrew Union College for this translation.

# THE YELLOW FEVER EPIDEMIC OF 1793 IN PHILADELPHIA*

*By* WILLIAM S. MIDDLETON, M.D.

MADISON, WIS.

LATE in the sixteenth century the small island of St. Kitts, whose hospitable shores had welcomed Columbus in 1493, sheltered a thriving colony of French and English. Their prosperity excited the envy of the Spanish who unceremoniously evicted them. Thereupon these refugees occupied Tortuga and later the western portion of Haiti to which they gave the name of Saint Dominique in 1630. This part of Haiti was ceded to the French by the treaty of Ryswick in 1697. Slavery was introduced and the colony thrived. Its population became overwhelmingly black, and the whites and mulattoes constituted a dominant minority. However, all was well until the National Convention in 1791 acceded to the demands of the free colored and mulattoes, and granted them the full privileges of French citizenship. This action was violently opposed by the white Colonists and by reason of their protests the decree was revoked by the home government. The seed had been sown and it bore fruit in an insurrection of the slaves supported by the mulattoes. General Galbo was directly charged with inciting certain irresponsible whites to set upon the French commissioners who had brought the authority for his suspension from Paris. To their defence the commissioners called the blacks whose interests they were naturally supposed to represent. In the resulting warfare the cruelty of the involved parties exceeded description. The French commission abolished slavery in 1793, but by that time disease and excesses of all types had made Santo Domingo a most unhealthy community. Upward of fifteen hundred of the white population who had escaped, after harrowing experiences at the hands of the blacks, sought refuge on the mainland of North America, since the violence of the French Revolution precluded possible return to the homeland.

Among the cities of the New World none was more liberal in its offer of shelter and financial aid to the unfortunate French emigré than was Philadelphia. In July 1793 over twelve thousand dollars were raised for the relief of these suffering refugees from Cape François. It was entirely fitting that the metropolis and the temporary seat of government of the new republic should thus manifest her sympathy for the unfortunate subjects of her recent ally. Indeed feeling ran high in those days and our national politics were strongly tinted by the supposed reaction of leaders toward political movements in France and England. Material wealth had advanced Philadelphia to a position of preeminence among the cities of the United States. The Delaware was crowded with shipping from all countries. Some five miles down the river East India men were greeted by the boom of a cannon reserved for such arrivals. Great fortunes were in the making and among these none was more romantic than that of Stephen Girard, a sea captain who had sailed his ship up the Delaware, in May 1776, to escape a British fleet. Here Girard found his bride and a fortune in the West Indian shipping. The enviable position of Philadelphia depended more upon her institutions than upon her wealth. Her hospitality had become even at this early period a byword among travelers. It was to this generous community that the French refugees from Santo Domingo came in July and August of 1793.

The season was quite warm. Indeed the year 1793 was long recalled for its unseasonableness. January had been very moderate. The usual raw February of southeastern Pennsylvania succeeded. The fruit trees had blossomed in Philadelphia on April first. The migratory birds had made their appearance two weeks early. May had been a moderate month. June had had its quota of warm days and July had been uniformly warm. The first three weeks of August were moderate and pleasant. On August 25th there was a heavy rain storm and thereafter except for very light showers on September ninth and October twelfth no rain fell until October fifteenth. Springs and wells failed. The dust in the roads reached a depth of two feet. The pastures burned out and apples and pears shrivelled on the trees. Sir John Pringle had noted that "when the heats come on soon, and continue throughout autumn, not moderated by winds, or rains, the season proves sickly, distempers appear early, and are dangerous."

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* Read before the Medical History Seminar, University of Wisconsin.

The historical relation is lost if the student commits the anachronistic error of hindsight. So one must follow Noah Webster through the maze of natural phenomena which were thought to influence atmospheric conditions and as a derivative whereof epidemics arose. Certain it was that David Rittenhouse had in January and February, 1793 noted a comet in the constellation of Cepheus and on September twelfth a meteor had fallen between Third Street and the Hospital:

> In the years 1793 and 4, the oysters on the coast of Connecticut and Rhode Island, were all sickly, watery, and tasteless; wholly unfit for food, and in some instances brought on nausea or sickness in those who ate of them.

Together with other observers Webster remarked the uncommon prevalence of mosquitoes in Philadelphia during the summer and fall of 1793. A basis for Webster's failure to properly evaluate the relationship of this circumstance may be found in his statement:

> Infection is a subordinate cause of the propagating of malignant distempers; but is itself an effect of some more general cause, whose force is a hundred fold more powerful and formidable than that of infection.

He further effected an elaborate classification of epidemic diseases on the basis of their "natural" causes:

| | |
|---|---|
| In healthy periods | |
| Common intermittents<br>Remittents | solely from marsh effluvia, and ordinary causes. |
| In pestilential periods, under the operation of elemental causes. | |
| Intermittents.<br>remittents. | of a worse type, from marsh effluvia, aided by a general cause. |
| Bilious plague of the country, near lakes and rivers. | solely from marsh exhalations with the general cause. |
| Bilious plague of American cities | from the joint operation of vegetable and animal effluvia, with the elemental cause. |
| Inguinal plague of the east | principally from animal exhalations, with the elemental cause. |

Be that as it may, several events on the water front demand our attention. In the middle of July 1793 the sloop Amelia, William Williams, master, from Borgne, Santo Domingo docked with a cargo of coffee. Several hundred-weight of this perishable material had spoiled and were carelessly dumped on the wharf. It was reported that the captain and five hands were sick at the time of landing. On May twenty-ninth the xebeque Sans Culottes, twelve guns and one hundred men, made the Flora of Glasgow, outward bound for Jamaica with a cargo of dry-goods, her prize. They stopped at Chester and discharged her sick master, Hamilton Sage. On the authority of Dr. William Martin, the master of the Sans Culottes died of yellow fever at the home of William Kerlins. As the privateer and her prize passed the fort on Mud Island on the evening of July twenty-second, loud greetings were exchanged between the crews of the two ships and the garrison. Between July twenty-fifth and August first a number of sick were said to have been sent ashore from the vessels above-mentioned. From the statement of a super-cargo on a boat bound for Philadelphia six or seven men were ill of the fever on leaving Cape François. Thus unwittingly was the pestilence taken to the heart of the capital of the new republic.

Stephn Girard

Fig. 1. Stephen Girard.

Benjamin Rush, the most eminent figure in Philadelphia medicine of that period, has best recorded the awful pestilence that spread like wildfire through the unprotected city betrayed by its ignorance and generosity. Although in the light of modern knowledge, Rush held many untenable beliefs regarding the cause and the treatment of yellow fever, his stalwart devotion to duty and his remarkable fidelity in clinical observation place him on a pinnacle as yet unexcelled in American medicine. Rush records that on August fifth he was called to see Dr. Hodge's child "ill with a fever of the bilious kind, which terminated [with a yellow skin] in death." Inthe succeeding two weeks, five similar cases were attended without a suspicion of their true nature. On August nineteenth Mrs. Peter Le Maigre was seen in consultation with Doctors Foulke and Hodge in Water Street between Arch and Race:

> I found her in the last stage of a highly bilious fever. She vomited constantly, and complained of great heat and burning in her stomach. The most powerful cordials and tonics were prescribed, but to no purpose. She died on the evening of the next day. Upon coming out of Mrs. Le Maigre's room, I remarked to Dr. Foulke and Dr. Hodge, that I had seen an unusual number of bilious fevers, accompanied with symptoms of unusual malignity, andthat I suspected all was not right in our city. Dr. Hodge immediately replied, that a fever of a most malignant kind had carried off four or five persons within sight of Mr. Le Maigre's door, and that one of them had died in twelve hours after the attack of the disorder. This information satisfied me that my apprehensions were well founded. The origin of this fever was discovered by me at the same time, from the account which Dr. Foulke gave me of a quantity of damaged coffee which had been thrown upon Mr. Ball's wharf, and in the adjoining dock, on the 24th of July, nearly in a line with Mr. Le Maigre's house, and which had putrified there to the great annoyance of the whole neighborhood.

One unauthenticated record noted the death of a Mrs. Parkinson after four days' illnesson August seventh at Richard Denny's lodging house in Water Street. All sources agree in the location of the earliest cases in the congested district along the waterfront, although James Hutchinson for a time felt that the pestilence might first have appeared in Kensington, then a remote neighborhood well up the Delaware.

Of the beginning of the epidemic of 1793 the above statements are a fair analysis. Obviously there was a wide divergence of opinion as to the origin of the yellow fever, and it is not surprising that some of the more conservative practitioners were loathe even to admit its presence in the city. In the *National Gazette* of September twentieth

Dr. William Currie attempted to put at rest the fears of the laity in these words:

> I have made the strictest enquiry respecting the number at present confined by the genuine yellow fever, and am convinced that it does not exceed 40 or 50 in the whole city. There is, however, another formidable disease prevalent, by which, I have reason to believe, there are above a thousand ill at this time. The disease, I mean, is the common remittent or fall fever. This fever, however, is not infectious . . . The disease which Dr. Rush calls the yellow fever, and of which Dr. P. says he has cured such numbers by the New Method, is only the fall fever, operating on persons who have been previously affected by influenza. It is time the veil should be withdrawn from your eyes, my fellow citizens.

Supporters of the local origin of the fever rallied to the banner of Benjamin Rush, while the foreign origin found its chief proponents in the College of Physicians. Possibly no great harm would have resulted from this professional difference had the public press not published from day to day and indeed frequently in the same issue the divergent views of the leaders in medicine. Rush with characteristic vigor maintained the local origin of the epidemic through the public press. A significant remark is found in his communication to the *American Daily Advertiser* of August twenty-ninth: "The noxious quality of the effluvia from millponds is derived wholly from a mixture of the putrified leaves and bark of trees, with water."

On September second through the same medium Medicus replied,

> Let others at invention aim,
> I seek no falsities for fame.
>
> Mr. Dunlap, a correspondent in yesterday's paper, under the signature of R, has called the attention of your readers to the cause of the malignant fever, which now prevails in the city of Philadelphia. As he appears to be an advocate for the "damaged coffee," being the source of the complaint, and as this coffee has made as much noise, and with equal cause, as the scratchings of the Cock Lane Ghost did in the city of London, it may not be amiss to enquire how far the opinion is founded on truth . . . As your correspondent has been the first to throw the gauntlet, it is expected he will once more enter the lists, or it will be taken for granted, he has experienced a shameful defeat.

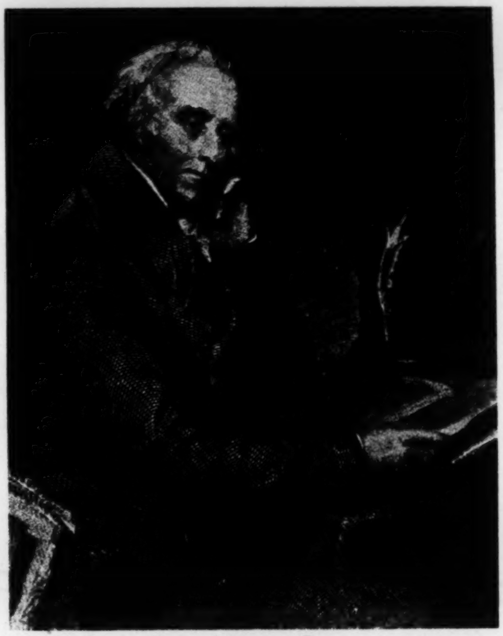

FIG. 2. BENJAMIN RUSH.

And then to clinch his argument Medicus added:

> Since writing the above I have been informed that a number of poor people, who live down Passyunk road, gathered a quantity of damaged coffee, carried it home, and are now in perfect health. A strong presumptive proof against any noxious exhalation from that substance.

Prominent among the supporters of Rush in the public lists was Charles Caldwell, one of his students, writing under the nom de plume of Araeteus, Jr. In later communications Rush called upon the College to defend the "character of their departed brother, Doctor Hutchinson, for capacity and vigilance in his office, as inspector of sickly vessels." He caustically remarked:

> Public report had derived it from several different islands; had chased it from ship to ship, and

from shore to shore; and finally conveyed it at different times into the city, alternately by dead and living bodies; and from these tales, all of which when investigated were proved to be without foundation, the College of Physicians composed their letter. It would seem from this conduct of the College as if medical superstition had changed its name, and that in accounting for the origin of pestilential fevers, celestial, planetary, and demoniacal influence, had only yielded to the term, importation. Why should it surprise us to see a yellow fever generated amongst us? It is only a higher grade of a fever which prevails every year in our city, from vegetable putrefaction. Loathsome and dangerous diseases have been considered by all nations as of foreign extraction. The venereal disease and the leprosy have no native country, if we believe all the authors who have written upon their origin.

There can be little wonder that this ill-timed and futile discussion led to indecision and confusion on the part of the populace. To add to the horror of the situation the pestilential visitation which appeared along the river front, spread steadily to Kensington, the Northern Liberties and outlying districts. As the disease reached the center of the city a new impetus was lent to its advance. Three hundred deaths from yellow fever were reported in August and in September the toll reached fourteen hundred. From fifty to ninety victims were claimed daily toward the end of September. The first half of October saw a death rate equivalent to that of the entire month of September. The peak was reached on October eleventh when one hundred and nineteen succumbed to the fever. The busy market places and streets were stilled and deserted. Human contact was assiduously avoided. The city famed for its hospitality now viewed with suspicion any display of attention. At the time of the outbreak of the fever President Washington was spending his vacation at Mount Vernon, where he remained until the epidemic had abated. Congress was not in session, but the governmental offices were removed to Germantown. With few exceptions all possessing means of flight left the less fortunate to their fate. The roads leading from the city of death were crowded with vehicles of every description. Over a third of the population estimated at fifty thousand sought refuge in the surrounding country. The hegira was in full swing by September twenty-fifth. Over half of the homes were closed; and yet with the obvious lack of protection only two robberies were reported during the epidemic. An unbelievable desolation supplanted peaceful prosperity. The deserted state of the erstwhile busy waterfront reflected the despair of the people and the ostracism of the port by foreign shipping. Funerals were for a time dignified by proper equipages and attendants, but shortly the demand and the associated terror led to the too familiar picture of a black leading a single horse drawing a coffin on a pair of chair wheels with a few relatives following at a distance. Finally even this formality was dispensed with from necessity and the cart with its common drivers patrolled the streets with their call of "Bring out your dead." It was a picture to instill fear in the hearts of the most sturdy. And yet Benjamin Rush was prompted by his experiences in that awful period to say, "I saw little to blame, but much to admire and praise in persons of different professions, both sexes, and of all colours." Matthew Carey wrote, "I rejoice, that it has fallen to my lot to be a witness and recorder of a magnanimity, which would alone be sufficient to rescue the character of mortals from obloquy and reproach."

The College of Physicians issued a bulletin on August twenty-sixth in which the avoidance of contact with the infected was urged. Placarding of the houses in which yellow fever occurred, was recommended. Advice in the care of patients, fomites and excreta was given. It was suggested that a large airy hospital be established in the vicinity of the city. Bells should not be tolled. Burials should be as private as possible. A city-wide cleansing of streets and wharves was deemed essential. The practice of lighting bonfires served no good purpose in their judgment. Gun powder was thought to be more efficacious. In the matter of personal hygiene, excesses of physical exertion, eating and drinking were to be eschewed. Exposure to "currents of air, or in the evening air" was believed to be harmful. Vinegar and camphor "cannot be used too frequently upon handkerchiefs or in smelling bottles by persons whose duty calls them to visit or attend the sick." Dunlap's *American Daily Advertiser* for August twenty-eighth contains the following directions for the use of the widely recommended "Vinaigre des Quatre Voleures:"

> As a contagious Disorder has appeared in this City, it is thought proper to request the printer to publish what is said to be the Receipt communicated by Four Thieves, for preventing infectious Distempers, viz.
>
> Take of rue, sage, mint, rosemary, wormwood and lavender, a handful of each; infuse them together in a gallon of white wine-vinegar; put the whole in a stone pot closely covered up, upon warm wood ashes for four days; after which, draw off (or strain through fine flannel) the liquid, and put into bottles well corked; and into every quart bottle put a quarter of an ounce of camphor. With this preparation, wash your mouth, and rub your loins and temples every day; snuff a little up your nostrils when you go into the air, and carry about you a bit of sponge dipped in the same, in order to smell to upon all occasions, especially when you are near any place or person that is infected.

By these precautions the notorious "four thieves" were said to have escaped infection in spite of intimate exposure. To tar, vinegar and camphor Benjamin Rush attributed no prophylactic virtue, but he was inclined to think that garlic might be useful in this direction, for he had "met with several persons who chewed it constantly, and who were much exposed to the contagion without being infected." Dr. Goos advised a preventive decoction made from twelve turnips, one endive and eight carrots in one gallon of water which was boiled to three quarts. This quantity was to be consumed in two or three days. Clysters of the same decoction were recommended.

Rush made a number of interesting observations on the relation of occupation and other circumstances to an apparent immunity to infection. Individuals confined to hospitals or prisons conspicuously escaped the disease. "Shut-ins" in general who had no outside contacts, likewise experienced an apparent immunity. Rush believed that the escape of sailors who refused shore-leave, was dependant upon the absence of effluvia in the air on shipboard; and contradicting his earlier observations of the inefficacy of tar in the prophylaxis of yellow fever he stated that the odor of tar might help in this direction. The freedom of certain confirmed drunkards from the fever was explained by the Brunonian theory in that the "stimulus of ardent spirits, probably predominated over the stimulus of the contagion, and thus excited an artificial fever which defended the system from that which was epidemic." Singularly there was little propagation of the infection into the country, even though infected individuals at times were moved to the rural districts or refugees from the city were stricken there. Butchers, painters, garbage collectors, and grave diggers were among the trades least affected. With regard to the last named Rush stated that "there seems to be something in the fresh earth which attracts or destroys by mixture, contagion of every kind." Prior to this epidemic negroes were supposed to enjoy a relative immunity to yellow fever. Rush early issued the following statement:

> It has been remarked that the black people have in no instance been infected with the malignant fever which now prevails in our city. The late Dr. Lining, of South Carolina, long ago made the same remark. "There is something very singular (says the Doctor) in the constitution of the negroes which renders them not liable to this fever; for though many of them were as much exposed as the nurses to the infec-

tion, yet I never knew of one instance of this fever among them, though they are equally subject with the white people to the bilious fever."

To the purport of this observation further attention will be later directed. In the present relation it need only be added that the mortality from yellow fever was relatively higher in the negro than in the white population during the epidemic of 1793. Currie in a footnote to his monograph of 1794 explained the apparent freedom of the French emigrés from yellow fever by their isolation rather than by immunity. While clothes were believed to be media of transmission, paper was not thought to be capable of so acting. Rush was noncommittal in the matter of the danger of graveyards. He stated:

> There were for several weeks two sources of infection, viz. exhalation and contagion. The exhalation infected at the distance of three and four hundred yards; while the contagion infected only across the streets. The more narrow the street, the more certainly the contagion infected. Few escaped it in alleys.

Carey records that there were thirty-two fever victims in thirty houses in Pewter Platter Alley.

A most remarkable contribution to the prophylaxis of yellow fever appeared in the *American Daily Advertiser* of August twenty-ninth but apparently attracted little attention:

> As the late rains will produce a great increase of mosquitoes in the city, distressing to the sick, and troublesome to those who are well, I imagine it will be agreeable to the citizens to know that the increase of those poisonous insects may be much diminished by a very simple and cheap mode, which accident discovered. Whoever will take the trouble to examine their rain-water tubs, will find millions of the mosquitoes fishing (?) about the water with great agility, in a state not quite prepared to emerge and fly off: Take up a wine glass full of the water, and it will exhibit them very distinctly. Into this glass pour half a teaspoon full, or less, of any common oil, which will quickly diffuse over the surface, and by excluding the air, will destroy the whole brood. Some will survive two or three days but most of them sink to the bottom, or adhere to the oil on the surface within twenty-four hours. A gill of oil poured into a common rain-water cask, will be sufficient: large cisterns may require more; and where the water is drawn out by a pump or by a cock, the oil will remain undisturbed, and last for a considerable time. Hickory ashes have been tried without effect.

The initials affixed to this item, A. B., do not identify the author; but it is safe to say that neglect to follow the advice given, on a wholesale scale, cost Philadelphia untold misery and wealth. Whereas the principle involved in this suggestion was unwittingly tantamount to the prophylaxis of yellow fever, the efforts of the people of Philadelphia, in 1793, were directed toward the care of the afflicted and the limitation of the spread of an infection they could only objectively comprehend.

The following excellent advice from a layman in the *American Daily Advertiser* for August twenty-fourth, 1793 likewise passed unheeded:

> Mr. Dunlap,
>
> A Mortal Disease has begun to rage in this city. It is probably infectious, and it is to be feared that it may become epidemic, unless measures are seasonably taken to prevent its progress. What can be done, or whether anything ought to be done, by the police of the city, I leave others to consider and decide. But allow me, through the medium of your paper, to suggest to the faculty of physicians, whether it might not be proper for them to attempt something, in concert for the cure and prevention of this dangerous malady. In difficult cases a consultation is usually called. The idea is that a comparison of sentiments and a communication of information, among men of skill and observation, may effect that, to which the unassisted abilities of any individual might not be competent. Would it not then be desirable that a general consultation should voluntarily take place, relative to the general treatment of a dangerous disease, which threatens the lives of hundreds? Might not a method of cure probably

be suggested and agreed upon, that would not otherwise be readily or generally known? Might not much useful information, at any rate, be communicated which individual practitioners would not otherwise possess? These ideas have had so much weight with my mind that I have thought it my duty to throw them before the eye of the public. I am not myself a physician. It would therefore not be proper for me even to suggest the mode in which the proposed communication should be made. The known benevolence of the professors of the medical art in Philadelphia, and their numerous exertions in the cause of humanity leave me no room to doubt that if they judge that any thing useful would result from the measures hinted at they will easily find the means of carrying them into effect. I shall only further remark that if any method can be devised to preserve those from taking the infection who are exposed to its influence, it would be a most important discovery and ought to be made as public as possible.

Philanthropos.

Philadelphia, August 22, 1793.

The peace-maker reckoned without his host.

The practice of Benjamin Rush is outlined in his account of his second attack of yellow fever:

> On the ninth of October, I visited a considerable number of patients, and as the day was warm I lessened the quantity of my clothing. Toward evening I was seized with a pain in the back which obliged me to go to bed at eight o'clock. About twelve I awoke with a chilly fit. A violent fever with acute pains in different parts of my body, followed it. At one o'clock I called for Mr. Fisher who slept in the next room. He came instantly, with my affectionate black man to my relief. I saw my danger painted in Mr. Fisher's countenance. He bled me plentifully and gave me a dose of the mercurial medicine. This was immediately rejected. He gave me a second dose, which likewise acted as an emetic, and discharged a large quantity of bile from my stomach. The remaining part of the night was passed under an apprehension that my labours were near an end. I could hardly expect to survive so violent an attack of the fever, broken down as I was, by labour, sickness and grief. My wife and seven children, whom the great distressing events that were passing in our city, had jostled out of my mind for six or seven weeks now resumed their former place in my affections. My wife had stipulated in consenting to remain in the country, to come to my assistance in case of my sickness; but I took measures which without alarming her, proved effectual in preventing it. My house was a Lazaretto, and the probability of my death, made her life doubly necessary to my family. In the morning, the medicine operated kindly, and my fever abated. In the afternoon it returned, attended with a great inclination to sleep. Mr. Fisher bled me again which removed the sleepiness. The next day the fever left me, but in so weak a state that I awoke two successive nights with a faintness which threatened the extinction of my life. It was removed each time by taking a little aliment. My convalescence was extremely slow. I returned in a very gradual manner to my former habit of diet.

The "mercurial medicine" referred to by Rush was the famous "ten and ten," the evolution of which is quite interesting. As a student under John Redman in the epidemic of 1762 the value of gentle purges had been remarked. John Mitchell of Virginia had advised Glauber's salt in this relation in the yellow fever of 1741. By reason of the failure of this medication Rush reasoned that emetics were indicated to meet the great indirect debility. Bark in all forms proved ineffectual as did also blisters applied to the neck, head and extremities. The warm packs of vinegar advised by Hume had no beneficial action in his experience. Rush consulted Doctor Stevens, late of St. Croix, West Indies, whose ideas in therapy had a considerable vogue, but trial convinced Rush of their inefficacy. The literature on the management of this malady was very contradictory. In one of the Continental hospitals during the Revolutionary War, Doctor Thomas Young, a senior surgeon, had used a formula of ten grains of calomel and ten grains of jalap, which was known as "ten and ten." Believing that his earlier failures might have resulted from the inadequate purgation, Rush substituted the formula of Young. "The jalap appeared to be a necessary addition to it, in order to quicken its passage through the bowels; for calomel is slow in its operation, more especially when it is given in large doses." If this dosage were not sufficient, the jalap was increased to fifteen grains and commonly the latter combination was repeated twice at six hour intervals or until four or five large evacuations resulted. In addition venesection constituted an important adjunct to his management; but since he was certain that ill effects might result, blood was let especially when a crisis did not occur in three days. Further indications for blood letting lay in a tense pulse, moist white tongue on the first day of the disease ["a certain sign of an inflammatory fever"], hemorrhage and congestion of the brain. The amount of blood let was determined by the season, the pulse and other equally unrelated factors. As much as one hundred ounces were let in ten days. Doubt has been cast upon the period of time covered by the venesections of Doctor James Mease which totalled one hundred and sixty-two ounces according to Rush. But then the elder Shippen writing from his retirement at Oxford Furnace, New Jersey to Rush on October thirteenth, 1793 said, "Desperate diseases require desperate remedies. You should bleed your patients almost to death, at least to fainting." In substantiation of this position he quoted the physician-buccaneer, Thomas Dover. One of Benjamin Rush's staunch supporters, Doctor Griffitts, on leaving Philadelphia to recuperate from his third attack of yellow fever wrote:

> I cannot leave town without a parting adieu to my kind friend, and sincere prayers for his preservation. I am sorry to find that the use of the lancet is still so much dreaded by too many of our physicians; and while lamenting the death of a valuable friend this morning, I was told that he was bled but once during his disorder. Now if my poor frame, reduced by previous sickness, great anxiety, and fatigue, and a very low diet, could bear seven bleedings in five days, besides purging, and no diet but toast and water, what shall we say of physicians who bleed but once.

Cool air, cold drinks, a low diet and cold sponges were also advised.

Rush's enthusiasm over the results of his treatment knew no bounds. He outlined his plan to the College of Physicians on September third. Casual meetings on the street afforded another medium of transmission of his discovery to professional brethren. He wrote:

> Never before did I experience such sublime joy as I now felt in contemplating the success of my remedies. It repaid me for all the toils and studies of my life. The conquest of this formidable disease, was not the effect of accident, nor of the application of a single remedy; but it was the triumph of a principle in medicine. The reader will not wonder at this joyous state of my mind, when I add a short extract from my note book, dated the 10th of September. "Thank God! Out of one hundred patients, whom I have visited, or prescribed for, this day, I have lost none."

Rush's plan of treatment was the outgrowth of his theory of the origin of fever in a convulsion of the arterial system, and his manner of practice had the unequivocal support of a considerable group of influential practitioners, notably Griffitts, Say, Pennington and his former students, Leib, Porter, Annan, Woodhouse and Mease. But it is not to be supposed that these radical measures were generally accepted by the medical profession.

> Dr. Kuhn called it a murderous dose. Dr. Hodge called it a dose for a horse. And Barton called it a devil of a dose. Dr. Hutchinson who is nearly as large as Goliath of Gath, and quite as vauntful and malignant, even threatened to give me a flogging. Dr. Hutchinson flog me. Why, gentlemen, if a horse kicks me, I will not kick him back again. But here is my man Ben whose trade it is to beat horses. He is willing to meet Dr. Hutchinson in my place, and play brute with him as soon as he pleases. I have that to do which belongs to a man.

To add fuel to the flame, Adam Kuhn whose contact with the epidemic dated from August twenty-third to September third and whose experience in the treatment of yellow fever in 1793 was, according to Rush, limited to seven cases, addressed a letter to the *General Advertiser* on September eleventh, in which he condemned the use of emetics and purgatives. The bark was advocated. Hydrotherapy of the following order was advised after the method of "De Haehn of Breslau;" "The patient is to be placed in a large empty tub, and two buckets of water of the temperature of about 75 to 80 degrees of Fahrenheit's thermometer, according to the state of the atmosphere, are to be thrown over him." This procedure was to be employed twice daily. In support of his plan Kuhn quoted Stevens of the West Indies. On the succeeding day Rush replied:

> The yellow fever now prevailing in our city, differs very materially from that which prevails in the West Indies, and in several particulars from that of the year 1762. This will easily be believed by all those who attend to the influence of climate and seasons upon diseases. Prescribing for the name of a disease, without a due regard to the above circumstance, has slain more than the sword. My only design in withdrawing myself for a moment from the solemn duties to my fellow citizens, in which I am now engaged is to bear testimony against a method of treating the present disorder, which if persisted in would probably have aided it in desolating three-fourths of our city. I have had so many unequivocal proofs of the success of the short and simple mode which I have adopted, of treating this disorder that I am now satisfied, that under more favorable circumstances of attendance upon the sick the disease would yield to the power of medicine with as much certainty as a common intermitting fever.

And so the battle between the West Indian plan of stimulation, tonics, bark, opiates and cold baths without laxatives and the Rush plan of bleeding and purging sundered the profession in a time, when public confidence could ill afford the shock of an open division of opinion.

The Ridgway Library collection of Rush's correspondence contains the following interesting example of the strained professional relations of those times:

Dear Sir,

I regret that you and I differ so much in our opinions and practice in the prevailing Epidemic, that it is impossible for us to consult together in any case whatever, hereafter, with Safety to a patient.

From Dear Sir, your
friend.
Benj'n Rush.

October 3rd, 1793
To Dr. Hodge.

In his account of the yellow fever Rush thus explained his position:

> One thing in my conduct toward these gentlemen may require justification; and that is, my refusing to consult with them. A Mahometan and a Jew might as well attempt to worship the Supreme Being in the same temple, and through the medium of the same ceremonies, as two physicians of opposite principles and practice, attempt to confer about the life of the same patient. Humanity was therefore on the side of leaving them to themselves.

Through his modified Brunonian conception of disease Rush thought that by purgation an artificial weak part was created in the bowels; thus "I diverted the force of the fever to them, and thereby saved the liver and brains from fatal or dangerous congestions." As the results of his heroic therapy he believed that the slow pulse was elevated and the elevated, reduced; the patient was strengthened and revived; fever was reduced; sweats were induced; vomiting was checked; obstruction in the lymphatic system was removed and jaundice prevented.

Two factors probably led to Rush's next step of popularizing this method of treatment, namely his sincere conviction in its efficacy and the total inadequacy of medical personnel to cope with the situation. The medical profession paid a heavy toll of morbidity and mortality to the fever; and at one time from this cause and from defection from the call of duty it was said that only three physicians were available in the city to treat not less than six thousand cases of yellow fever. Under the circumstances it is not strange that the indefatigable Rush resented the intrusions of "medical gentlemen, who beheld the disease at a distance." It is nevertheless interesting to trace the steps of his departure from the narrow path of strictly ethical practice. The apothecaries were instructed in the preparation of and directions for the use of "ten and ten." The technique of venesection was taught not only to medical students but also to nursing attendants of all orders and races. No opportunity was lost to advise people on the streets of any impropriety that might lead to infection. Charles Caldwell related a characteristic episode: When the familiar conveyance of the famous doctor was seen to pass into one of the remote sections of the city, Kensington, a considerable group of citizens solicitous for the welfare of relatives gathered at a bridge over which he would have to pass on his return to the city to enlist his aid. In answer to their inquiries as to the proper method of treatment of the fever he said, "I treat my patients successfully by blood letting, and copious purging with calomel and jalap in doses of ten grains of each for adults, and six or eight for children and I advise you, my good friends to use the same remedies."

"What," said a voice from the crowd, "bleed and purge every one?"

"Yes," said the doctor, "bleed and purge all Kensington. Drive on, Ben."

In the judgment of Rush, "the danger of delay in using one, or both those remedies, should be inculcated in the strongest terms, for the disease, like Time, has a lock on its forehead, but is bald behind." Finally he came to the conviction that "it is time to take the cure of pestilential fever out of the hands of physicians, and to place it in the hands of the people." The result of such a teaching he clearly foresaw in that "the pride and formalities of medicine, as far as they relate to this disease, are now as completely discarded in our city, as the deceptions of witchcraft were, above a century ago."

The civic authorities early recognized the emergency and the necessity for the segregation of the sick. The Spruce Street Almshouse closed its doors to the fever patients by order of the Guardians of the Poor. Pennsylvania Hospital encountered difficulties in excluding yellow fever patients. The Minutes of the Managers note:

> A special meeting held at the house of Samuel Coates, 8 mo, 28, 1793 for the purpose of looking into a violation of the rules of the Hospital on account of patients having been admitted, said to be suffering from "yellow fever" . . . Two men had lately been admitted who were infected with a putrid malignant fever, which now prevails in the city; one of whom [a negro] died the morning after he came in; and the other supposed to be in the last stage of Yellow Fever, for which there is great reason to fear the spreading thereof, to the danger of the other patients in the House.

Doctor Foulke who was responsible for the admission of these cases, was requested to investigate the matter and all members of the staff were asked to exercise unusual caution in the examination of patients prior to their admission to the wards of the Hospital. To provide temporary quarters for these patients, the circus of Mr. Ricketts at the Commons was commandeered by the Guardians on August twenty-sixth; but no provision was made for the care of the sick. So that of the seven patients committed there, two died and a third crawled away. The body of one of these two victims was unclaimed and left to decompose for two days, when with the help of a servant girl, a carter took it away. Threats of citizens in the neighborhood of the Commons to fire the circus led the Guardians to seek quarters for housing these patients remote from the heart of the city. On August thirty-first Bush Hill, the deserted mansion of William Hamilton, was taken over by eight of the Guardians with the sanction of Governor Mifflin. At first a staunch supporter of the Continental cause, raising a regiment in its behalf, William Hamilton had deserted his position and late in 1778 found himself one of sixteen on trial for treason before Chief Justice McKean. A letter from Isaac Ogden of New York to Joseph Galloway, London, dated November twenty-second, 1778 explains the situation:

> Billy Hamilton had a narrow escape; his Tryal for treason, against the States lasted twelve hours. I have seen a Gentle'n who attended his Tryal. He informed me that his Acquittal was owing to a Defect of Proof of a Paper from Lord Cornwallis, the Direction being torn off.

Two of his co-defendants at this time were hung. John Adams had occupied Bush Hill for two or three years of his term as vice president and Mrs. Adams wrote to her daughter as follows:

> Although there remains neither bush nor shrub upon it, nor very few trees except the pine grove behind it, yet Bush Hill is a very beautiful place; but the grand and sublime I left at Richmond Hill. The cultivation in sight and the prospect are superior, but the Schuylkill is no more like the Hudson than I to Hercules.

The Adams had left Bush Hill prior to the epidemic, but the tenant Thomas Boyles vigorously opposed its occupancy. However, he was permitted to remain in the house adjoining the mansion and on the evening of August thirty-first the four patients remaining at the circus were removed to Bush Hill, which thereby took its unusual position in the history of the yellow fever of 1793. Its high and airy site offered an ideal situation for a hospital. Nevertheless its early mismanagement led it to ill-repute. To begin with the facilities were inadequate and the building greatly overcrowded. Drunken and irresponsible help alone seemed obtainable; and so great was the terror instilled in the minds of Philadelphians that transfer to this temporary hospital was generally resisted. A rather overdrawn picture of conditions in Bush Hill at that particular time is found in Charles Brookden Brown's "Arthur Mervyn":

> The atmosphere was loaded with mortal stenches. A vapour, suffocating and malignant, scarcely allowed me to breathe. No suitable receptacle was provided for the evacuations produced by medicine or disease. My nearest neighbor was struggling with death, and my bed, casually extended, was moist with the detestable matter which had flowed from his stomach.

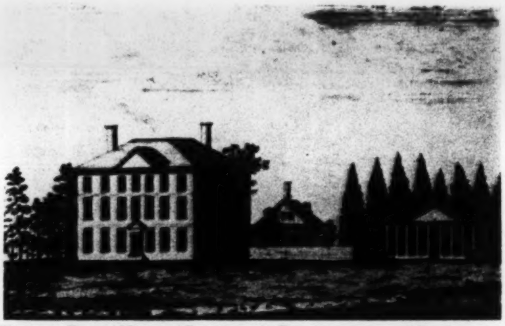

FIG. 3. BUSH HILL. (COURTESY, PENNSYLVANIA HISTORICAL SOCIETY.)

> You will scarcely believe that, in this scene of horrors, the sound of laughter should be overheard. While the upper rooms of this building are filled with the sick and the dying, the lower apartments are the scene of carousals and mirth. The wretches who are hired at enormous wages, to tend the sick and convey away the dead, neglect their duty, and consume the cordials which are provided for the patients, in debauchery and riot.
>
> A female visage, bloated with malignity and drunkenness, occasionally looked in. Dying eyes were cast upon her, invoking the boon, perhaps, of a drop of cold water, or her assistance to change a position which compelled him to behold the ghastly writhings or deathful smile of his neighbor.
>
> The visitant had left the banquet for a moment, only to see who was dead. If she entered the room, blinking eyes and reeling steps showed her to be totally unqualified for ministering the aid that was needed. Presently she disappeared, and others ascended the staircase, a coffin was deposited at the door, the wretch, whose heart still quivered, was seized by rude hands, and dragged along the floor into the passage.

On September fourteenth two of the physicians to Bush Hill, Drs. Physick and Cathrall, reported a state of complete disorganization and confusion to the Committee of Health. They outlined the needs of the institution. The Committee voted to petition the Bank of North America for a loan of 1500 dollars to meet these requirements. The next day two men of spirit and decision volunteered their services to oversee the hospital at Bush Hill; and from that time until the end of the epidemic the millionaire shipper and merchant Stephen Girard and the noble Moravian Peter Helm worked shoulder to shoulder with total disregard for personal danger or reward. They spent from six to eight hours daily at Bush Hill, frequently engaged in most lowly tasks. Girard directly supervised the internal administration of the hospital, while Helm oversaw the grounds and outlying buildings. Order was brought from chaos. The qualifications of nurses and attendants were investigated. Incompetency in all aspects of the hospital was summarily met. There still appeared to be confusion in the division of medical services. Doctors Leib, Cathrall, Physick and Annan had been in charge. On September sixteenth Doctor Deveze, lately arrived from Cape François, offered his services to the hospital. Whereupon the Committee:

> Resolved, that the Doctor be referred to the managers of the Hospital, and that in the meantime enquiry be made into his abilities and character, and if they should prove to be such as to justify his being employed, that when the Committee shall go into the appointment of Physicians, he have a part allotted to him.

Stephen Girard apparently acted as Deveze's sponsor in obtaining the appointment. On September eighteenth Deveze was given the unusual staff position of medical attendant on such cases as requested his services. This arrangement led to overlapping and dissatisfaction on the part of the other attending physicians. Various plans for the division of services were suggested; but in the end all members of the original medical staff resigned, leaving Deveze in charge. Doctor Benjamin Duffield offered his services to Bush Hill, and thereafter apparently the French physician and Duffield worked in close harmony.

The physical plant at Bush Hill and the organization under Girard and Helm deserve our attention. The mansion proper contained fourteen rooms together with three large entries which were utilized as chambers. To the matron, Ann Beakly, and her very capable assistant, Mary Savill, one of these passage rooms was assigned. The remainder of the rooms and entries were occupied by cots for the sick, a total of one hundred and forty beds being available. Particular care was directed toward the segregation of the desperately ill cases. A new frame house adjoining the mansion with three rooms on the ground floor accommodated seventeen patients, whereas its loft, sixty by eighteen feet, held cots for forty convalescents. Even the barn was utilized for the care of patients, room for forty convalescent men and fifty-seven convalescent women being provided therein. Here also resided the physician, apothecary and such men as were required to remain on the premises, except the cooks, steward, clerk and laborers who lived in other outbuildings. In all twenty nurses and attendants, equally divided between the two sexes, constituted an efficient nursing staff under Doctors Deveze and Duffield. One of the physicians supervised the diets of the sick. Two waiters were engaged to shave the patients. Each bed was supplied with sheets, pillow, two or three blankets, chamber, porringer, plate, spoon and clean linen. Bush Hill sheltered eight hundred and seven sufferers from the yellow fever in 1793, of whom four hundred and forty-eight died. Obviously perfect order prevailed. Rush wrote:

> [Bush Hill] was provided with all the necessaries and comforts for sick people that humanity could invent, or liberality supply. The attendants were devoted to their duty; and cleanliness and order pervaded every room in the house. The reputation of the hospital, and of the French physician, drew patients to it in the early stage of the disorder.

Instances of personal self-sacrifice and devotion in Philadelphia's awful trial were innumerable. It was to be expected that physicians would head the list. Ten doctors died of yellow fever and their names, Hutchinson, Morris, Lynn, Pennington, Dodds, Johnson, Glentworth, Phile, Graham and Green were engraved deeply in the grateful hearts of their fellow citizens. Of this group James Hutchinson was the most outstanding. As physician of the port he had met with severe criticism at the hands of a certain group supporting the foreign origin of the fever. Notwithstanding his implied responsibility for the health of the port on the one hand and for the failure to detain the ships bearing the pestilential fever on the other Hutchinson fearlessly maintained its foreign origin and devoted every effort to the care of its victims when the majority of medical men of his mind had deserted their posts of duty. As unselfish and self-effacing as their medical brethren were the clergy, of whom a like number laid down their lives in the service of their fellowmen. Only three Guardians of the Poor remained in the city and two of these, James Wilson and Jacob Tomkins, were martyrs to their duty. Mayor Clarkson was an able executive in those trying days. His Committee of Health constituted twenty-six members, of whom twenty-two answered the call of duty and four [Andrew Adgate, Jonathan Dickinson Sergeant, Daniel Offley and Joseph Innskeep] died. They met daily and their proceedings constitute a model of orderly efficiency and civic calm in the face of terrible distractions.

In more humble relations the negroes of Philadelphia played an important rôle in the epidemic. Benjamin Rush, as has been previously stated, had pointed out in the press the relative immunity of the negro race to yellow fever. He continued:

> The only design of this remark is to suggest to our citizens the safety and propriety of employing black people to nurse and attend persons infected by this fever; also, to hint to the black people, that a noble opportunity is now put into their hands, of manifesting their gratitude to the inhabitants of that city, which first planned their emancipation from slavery, and who have since afforded them so much protection and support as to place them, in a point of civil and religious privileges upon a footing with themselves.

The negroes promptly responded to Doctor Rush's suggestion and Mayor Clarkson wrote the following communication to Claypoole:

> Sir,
>
> It is with peculiar satisfaction that I communicate to the public, through your paper, that the African Society, touched with the distresses which arise from the present dangerous disorder, have voluntarily undertaken to furnish nurses to attend the afflicted; and that by applying to Absalom Jones and William Gray, both members of that society, they may be supplied.
>
> Matth. Clarkson,
> Mayor.
>
> September 6th
> 1793

The negroes thereafter rendered invaluable service in the care of the sick and the disposal of the dead. Doctor Rush taught them the approved method of blood letting. In the earlier editions of his "Account of the Malignant Fever," Matthew Carey was inconsiderate enough to lay the charge of profiteering at the hands of these negroes and to generalize on the class of individuals giving nursing attention. Absalom Jones and Richard Allen were quick to resent these charges and insinuations in a brochure appearing in 1794. One thrust was particularly pointed:

> Mr. Carey, although chose a member of that band of worthies who have so eminently distinguished themselves by their labours, for the relief of the sick and the helpless yet, quickly after his election, left them to struggle with their arduous and hazardous task, by leaving the city. 'Tis true, Mr. Carey was no hireling, and had a right to flee, and upon his return, to plead the cause of those who fled; yet, we think, he was wrong in giving so partial and injurious an account of the black nurses; if they have taken advantage of the public distress, is it any more than he hath done of its desire for information?

We believe he has made more money by the sale of his "scraps" than a dozen of the greatest extortioners among the black nurses.

In justice to the character of the nurses at Bush Hill, Carey should have stated that on the reorganization of that institution all attendants except two negresses were dismissed. In answer to the charge of appropriating household goods to themselves these negroes gave a strict accounting of such materials to Mayor Clarkson, who exonerated them from all blame. According to the common practice beds from infected houses had been buried to disinfect them, but all charges of misappropriation were definitely refuted.

Philadelphia was early cut off from communication with neighboring and remote towns. Postmasters held Philadelphia mail by tongs and dipped it into vinegar. Quarantine on travelers and baggage from the afflicted city was enforced in New York, Trenton, Baltimore, Reading, Bethlehem, Chestertown, Lamberton, Hagerstown, Havre de Grace, Newburyport, Newbern and Charleston. According to the *National Gazette* of September twentieth, "on the 14th instant a detachment of militia were marched out of Baltimore, to take possession of a pass on the Philadelphia road, in order to stop all persons going hence to that town." Shipping from Philadelphia was especially watched in Atlantic seaports. In contrast to this strict quarantine against Philadelphia stood the kindly asylum offered refugees in Woodbury and Springfield, New Jersey. Elizabethtown and Wilmington also opened their doors to those who fled Philadelphia. Chestertown and Elkton, Maryland and Chester, Pennsylvania provided shelter for the accommodation of those excluded by quarantine from the towns. And yet with this ostracism supplies and funds from the generous countryside flooded the stricken city.

As has been discussed, the peak of the epidemic was reached in the second week of October. On October fifteenth Rush wrote, "The clouds at last dropped health in showers of rain, which continued during the whole day, and which were succeeded for several nights afterwards by cold and frost." Carey was not inclined to believe that the rain of October fifteenth had anything to do with the subsidence of the epidemic, which in his judgment "died away with hardly any rain, and a very moderate degree of cold." By November ninth the daily death rate had fallen to six. As early as September twelfth the *Federal Gazette* contained this item, "Dr. R. does not believe it will be prudent for those persons who are in the country to return to town, until after frost or heavy rains have taken place, both of which alike weaken or destroy the contagion of the yellow fever." On October twenty-sixth Mayor Clarkson announced the abatement of the fever but recommended that the citizens should not return "for a week or ten days, or until we have some considerable rains; as the change of air would prove dangerous, and might probably be fatal to many."

Now was the appointed time. At first the refugees returned slowly to the city; and their ruddy complexions were in sharp contrast to the sallow cast of those who had remained in the city. Various methods were employed for destroying the contagion, for example, burying articles, baking in ovens, burning, whitewashing and fumigating with various aromatic vapors. Rush did not deem these measures in any sense necessary. He urged that the windows be thrown open and floors and walls washed. On the fourteenth of November Governor Thomas Mifflin proclaimed December twelfth as a day of thanksgiving for the city's deliverance from the pestilence.

Four thousand and forty-four lives had been lost in the epidemic and the commercial prestige of Philadelphia had suffered an irreparable injury. The future welfare of the city therefore held the public attention. Against further invasions of the yellow fever the precept of Rush apparently prevailed: "Without the matrix of putrid vegetable matters, there can no more be a bilious or yellow fever generated amongst us, than there can be vegetation without earth, water or air." He urged the drainage of swampy land and the planting of trees thereon. A comprehensive plan of wharf and street cleaning seemed to him to be indispensable for the protection of the health of the community. Noah Webster declared,

> I say nothing of Philadelphia for its position and the alterations in the original plan of the city have doomed it to calamity. The citizens will not believe the evil to arise among themselves and therefore must be left to their fate. If remitting fever every year, and yellow fever often, will not convince them that something is wrong in their city, it is in vain to reason with them. I believe that if all the cross streets and the back houses in Philadelphia could be levelled with the earth, and the ground converted into flower gardens and grass plats, the citizens would in twenty years celebrate the anniversary of their destruction, with as much fervor as the republicans in France celebrate the demolition of the Bastile.

Charles Caldwell, in 1801, pointed out that in 1762 Thomas Bond in a lecture at Pennsylvania Hospital had issued a warning that the filth of the city was capable of producing yellow fever. Caldwell further commented on the advantages of cultivation of the "Neck," a strip of low land between the Delaware and the Schuylkill Rivers, on which League Island Navy Yard and the Sesquicentennial Exposition have since been built. Laws relative to health protection and disease control were, enacted in Pennsylvania as a direct result of this epidemic. Furthermore, the port of Philadelphia was more adequately protected and a Lazaretto established.

Of the clinical studies of the fever no description compares with that of Benjamin Rush. He depicted the disease with the touch of a Sydenham. It is almost inconceivable that a man with his exacting and enormous practice, twice the victim of the disease himself, should have found time to make clinical notes, to engage in polemics and to maintain a wide correspondence in the hectic period of the epidemic. And yet among the classics in medicine stands his text, "An account of the Bilious remitting Yellow Fever, as it appeared in the City of Philadelphia in the Year 1793." Times have changed, and the Brunonian theory of disease has passed into the limbus of vain fancies and with it passed Benjamin Rush's conception of the unity of disease. From our remote position the soundness of his practice may be questioned, but this advantage may not be allowed in criticism. In justice to his honesty it must be granted that he personally submitted to his own plan of treatment. He came early to a conviction that yellow fever is not contagious. Caldwell assumed credit for Rush's position in this relation, by reason of the former's experience in mingling and sleeping with the patients at Bush Hill. Rush stated that in giving up the wearing of a cloth saturated in vinegar over the mouth, "Often I saw and felt the signs of the universal presence of the contagion in my system, I laid aside this, and all other precautions. I rested myself on the bedside of my patients, and I drank milk, or eat fruit in their sick rooms." The knowledge of the pathology of yellow fever was furthered by necropsies made at Bush Hill by Physick, Annan and Cathrall and later by Deveze. Notwithstanding the lessons drawn from this devastating epidemic of 1793, Philadelphia was doomed to repeated visitations of the yellow fever.

Immediately following the epidemic the College of Physicians reconvened and on November twenty-sixth submitted the following report in answer to Governor Mifflin's request for information relative to the source and the control of the fever:

> Sir,
>
> It has not been from a want of respect to yourself, nor from inattention to the subject, that your letter of the 30th ult. was not sooner answered; but the importance of the questions proposed, has made it necessary for us to devote a considerable portion of time and attention

to the subject, in order to arrive at a safe and just conclusion.

No instance has ever occurred of the disease yellow fever having been generated in this city, or in any other parts of the United States, as far as we know; but there have been frequent instances of its having been imported, not only into this, but into other parts of North America, and prevailing there for a certain period of time; and from the rise, progress, and nature of the malignant fever, which began to prevail here about the beginning of last August, and extended itself gradually over a great part of the city, we are of opinion that this disease was imported to Philadelphia, by some of the vessels which arrived in the port after the middle of July. This opinion we are further confirmed in by various accounts we have received from unquestionable authorities.

Signed by order of the College of Physicians
John Redman, President
November 26th
1793
To the Governor of Pennsylvania.

Redman signed this document under protest and two other members of the College, Foulke and Leib dissented from the majority report. The controversy had been so heated that on November fifth Benjamin Rush resigned from the College, but in so acting testified to his magnanimity by presenting the library of the College with a copy of Wallis' edition of the works of Sydenham. Governor Mifflin appreciating the open breech between Rush and the College, on November sixth sought the counsel of the former. A separate report bearing particularly on the local origin of the yellow fever was thereupon submitted by Rush, supported by Caldwell, Deveze, Coxe, Physick, Reynolds, Sayre, Otto, Boys, Cooper, Stuart, Pascalis and Strong.

While October saw the storm of the pestilence pass, yet the burden of the homeless and orphaned children proved a growing problem. On September nineteenth Mary Parvin, matron, reported thirteen children under her care in the Fifth Street house, provided by the city authorities as an orphanage. The increase in their number to twenty-seven by October thirteenth led to the establishment of adequate facilities in the Loganian Library with three men and seven women to assist the matron. Dr. Duffield supervised the temporary institution from a medical standpoint. On October twenty-third Mary Parvin reported that a total of one hundred and fifty-nine children had been under her care. Of this number seventy-seven remained in residence at that time; forty-three were with nurses outside of the home; thirty-one had found homes with kinsmen and eight had died. A loss of one tenth of her population indelibly impressed the horrors of the yellow fever epidemic of 1793 upon the people of Philadelphia. This memory was further extended to another generation by the legacy of orphanhood. American literature carries its awful picture to posterity in Charles Brockden Brown's "Arthur Mervyn" and S. Weir Mitchell's "The Red City."

# THE MEDICAL WISDOM OF DE QUINCEY

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## Opium

DE QUINCEY'S "Confessions of an English Opium-Eater"[1] ranks unquestionably as one of the most unique essays in the history of literature. As the supreme achievement of that master stylist, Thomas De Quincey (1785–1859), it is distinguished both for the beauty of its construction and the genuineness and sincerity of its revelations.

In vigorous and "impassioned prose," the writer has disclosed an immense fund of keen observation and speculation regarding the action, beneficent and pernicious, of the drug on the mind and body of man. As De Quincey declared at the beginning, what he contemplated was to emblazon the power of opium, "not over bodily disease and pain, but over the grander and more shadowy world of dreams." This purpose he succeeded magnificently in fulfilling.

In fitting words, Masson, his biographer and the editor of his works, comprehensively asserted[2]:

> It was as if among the specific potencies of opium was that of searching out whatever was stored up and dormant anyhow in the most secret intricacies of the nervous organism, unlocking all doors, compelling all the hoarded photographic impressions of all that had ever happened in the life of a human being from the hour of birth to yesterday, all that had gone into oblivion with himself and was known to God only, to flash out again, and become real and significant once more in the dreamy revel.

In addition to this apt summary, De Quincey himself expressed the conviction[3] that opium seems to possess "not merely a specific power for exalting the colors of dream-scenery, but for deepening the shadows, and above all, for strengthening the sense of its fearful realities."

With absolute verisimilitude, and with a vivid depiction of all their hideous aspects, he recorded the protracted, ever-changing, never-ending nightmares that coursed through his brains. His description of these impelling visions stands out unparalleled, and without doubt is the chief reason for the perennial popularity of the opium confessions.

De Quincey was exceedingly solicitous lest his "prostration before the dark idol" be cruelly misconstrued. It was not idle and vain search after pleasure, he insisted, that prompted him, in 1804, to purchase his first vial of the tincture of laudanum; it was the extremity of pain from which he was suffering, induced by two definite physical conditions.

Primarily he was tortured by a severe and constant attack of rheumatic toothache. The effect of the initial dose of narcotic which he was induced to take he found to be so divine in affording relief from his anguish, that he subsequently never allowed himself to be without a supply of the drug in one form or another.

The second predisposing ailment, as attested by Dr. Eatwell,[4] his attending physician, which spurred him towards his addiction, was a "slow or intermittent ulceration of the stomach," brought on apparently by insufficient and bad food during the many years of his poverty and vagrancy in London. The concomitant gastrodynia, he declared, made the use of drugs imperative.

Drawing an inference from his own case, De Quincey emphatically differentiated between addiction from choice and addiction from compulsion[5]:

> Toothache is recorded (in the Confessions) as the particular occasion which first introduced the author to the knowledge of opium. Whether afterwards, having been thus initiated by the

demon of pain, the opium confessor did not thus apply power, thus discovered to the purpose of mere pleasure, is a question for himself, and the same question applies with the same cogency to Coleridge. Coleridge began with rheumatic pains. What then? For our part we are slow to believe that any man did or could learn the somewhat awful truth, that in a certain ruby-colored elixir there lurked a divine power to chase away the genius of pain, or secondly, of ennui (which it is, far more than pain, that saddens our human life), without sometimes, and to some extent, abusing this power. To taste but once from that tree of knowledge is fatal to the subsequent power of abstinence. True it is that generations have used laudanum as an anodyne (for instance, hospital patients) who have not afterwards courted its powers as a voluptuous stimulant; but that, to be sure, has arisen from no abstinence in them. There are in fact, two classes of temperaments as to this terrific drug . . . those which are, and those which are not preconformed to its power; those which generally expand to its temptations, and those which frostily exclude them. Not in the energies of the will, but in the qualities of the nervous organization, lies the dread arbitration of, Fall or Stand: doomed thou art to yield or strengthened constitutionally to resist. Most of those who have but a low sense of the spells lying couchant in opium have practically none at all; for the initial fascination is for them effectually defeated by the sickness which nature has associated with the first stages of opium-eating. But to that other class, whose nervous sensibilities vibrate to their profoundest depths under the first touch of the angelic poison, opium is the Amreeta cup of beatitude. It is in the faculty of mental vision, it is in the increased power of dealing with the shadowy and the dark, that the characteristic virtue of opium lies. Now, in the original higher sensibility is found some palliation for the practice of opium-eating; in the greater temptation lies a greater excuse. And in this faculty of self-revelation is found some palliation for reporting the case to the world.

Samuel Taylor Coleridge, the creator of "The Ancient Mariner" and "Kubla Khan," dreamed by the poet during an opium sleep, had indulged to excess in the drug for twenty-five years. De Quincey was bitterly aroused by his casual contention that opium was "a thing to be laid aside easily and forever within seven days." Admitting the possibility, by sheer will power and grim determination, of weaning oneself away from the deep bondage, he scoffed at the idea of the leviathan being so easily tamed. One cannot so lightly shed his "frail, opium-shattered self," he maintained[6]:

> For where the liver and the other organs had, for so large a period of life, been subject to a continual morbid stimulation, it might be impossible for the system to recover a natural action. Torpor, I suppose, must result from a continual artificial excitement; and, perhaps, upon a scale of corresponding duration. Life, in such a case, may not offer a field of sufficient extent for unthreading the fatal links that have been wound about the machinery of health, and have crippled its natural play.

In addition, the joys of the addiction interfered with the desire for release. Opium was very desirable for its subtle ability, when wisely taken, of calming all irritations of the nervous system, of stimulating the capacities of enjoyment, and under any call for extraordinary exertion, of sustaining over a great period of time "the else drooping animal energies." Although, he declared, it could cause an extreme paralysis of the will and of the physical cravings, and although the opium-eater was tainted with the infirmity of leaving works unfinished, and of suffering reactions of disgust, still there was the positive value as a source of intellectual stimulation and exhilaration. It may be a prime curse in the sense that it interferes with high energies and great purposes, yet it gives as well as takes away:[5]

"It defeats the steady habit of exertion, but it creates spasms of irregular exertion. It ruins the natural power of life; but it develops preternatural paroxysms of intermitting power."

Its greatest sphere of legitimate activity was as a soother of pain, he found. In this respect it had no peer[1]:

> Opium, as the one sole catholic anodyne which hitherto has been revealed to man; secondly, as

the one sole anodyne which in a vast majority of cases is irresistible; thirdly, as by many degrees the most potent of all known counter-agents to nervous irritation, and to the formidable curse of taedium vitae; fourthly, as by possibility the sole agent, not for curing when formed, but for intercepting while likely to be formed, the great English scourge of pulmonary consumption, I say that opium is entitled to refuse the ordinary treatment which it receives in books.

Furthermore, for this decided value in combatting and vitiating pain, he felt that it should be enshrined upon a high pedestal:

> In one sense all medicines and modern medical treatment offer themselves as anodynes, that is, so far as they promise ultimately to relieve the suffering connected with physical maladies or infirmities. But we do not in the special and ordinary sense, designate as "anodynes" those remedies which obtain relief from pain only as a secondary and distant effect following out from the cure of the ailment; but those only we call anodynes which obtain this relief and pursue it as the primary and immediate object. Among the most potent of anodynes we rank hemlock, henbane, chloroform, and opium. But unquestionably the first three have a most narrow field of action, by comparison with opium. This beyond all other agents made known to man, is the mightiest for its command, and for the extent of its command, over pain.

De Quincey distinctly delineated between the actions of alcohol and opium. The effect of the former is to induce an acute or brief type of pleasurable feeling, in which the mental faculties are disordered, self-possession is destroyed, and judgment unsettled. The brutal, materialistic part of the nature of man is prominently evoked, and is accompanied by a vivid exultation of his loves and hatreds.

The pleasure, on the other hand, resulting from the use of opium, is chronic and stationary, exquisite order and harmony are introduced among the mental faculties and self-possession is sustained. There is a distinct warmth to the moral feelings and a serenity to all the bodily powers, while the diviner part of nature becomes predominant.

De Quincey never succeeded in completely throwing off the shackles of his opium-slavery. He did manage, however, to reduce his daily portion to an amount compatible with health, and the demands of his literary labors. His "Oriental pencil" was perhaps none the less effective for his intimate and prolonged associations with the juice of the poppy-seed, the veritable "liquid damnation."

### MADNESS

The study of an article by De Quincey called "Madness" shows the author to be the advocate of a very bizarre conception of the pathology of insanity, based perhaps on the current notions of Pinel. The greatest alienist of his time (1745–1826) wrote in his famous treatise on insanity:

"It seems that the primitive seat of insanity generally is in the region of the stomach and intestines, and it is from that centre that the disorder of intelligence propagates itself as by a species of irradiation."

Similarly, De Quincey, referring to the gland which he figuratively designated as "the Achilles' heel of almost every human fabric," asserted and defended the intestinal origin of the psychoses:

"I am persuaded that all madness, or nearly all, takes its rise in some part of the apparatus connected with the digestive organs, most probably the liver."

He held that the brain was viewed as the seat of the psychoses for two erroneous reasons; first, because the brain, being considered universally the organ of all thought, the deduction follows that any disease which disturbs thinking is naturally held to be seated there; and second, because at autopsies of lunatics, lesions of the brains are often found.

To these contentions he countered with the assertion that rather than consider the brain the sole organ of thought, on many grounds it should be insisted that the stomach and brain, through their reciprocal action, make up the compound organ of thought. As for the diseased appearance of brains at post-mortem examinations, he felt he could explain that satisfactorily in this fashion:

> No fact is better ascertained in modern pathology than the metastasis, or translation to some near or remote organ, of a disease which had primarily affected the liver, generally from sympathy, as it is called, but sometimes, in the case of neighboring organs, from absolute pressure when the liver is enlarged. In such cases, the sympathetic disorder, which at first is only apparent, soon becomes real, and unrealizes the original one. The brain and the lungs are in all cases of diseased liver, I believe, liable beyond any other organs to this morbid sympathy; and supposing a peculiar mode of diseased liver to be the origin of madness, we may assume this particular mode to generate a secondary disease in the brain.

His reasoning in this regard, which seems to be of a speculative nature, was mainly based on his personal experience. As he declared:

> For some years opium had simply affected the tone of my stomach, but as the stomach, by medicine, exercise, etc., began to recover its strength, I observed that the liver began to suffer. Under the affection of this organ, I was sensible that the genial spirits decayed far more rapidly and deeply; and that with this decay the intellectual faculties had a much closer sympathy. Upon this I tried some scores of experiments, raising and lowering alternately, for periods of forty-six, sixty, seventy-two, or eighty-four hours, the quantity of opium. As the opium began to take effect, the whole living principle of the intellectual motions began to lose its elasticity, and, as it were, to petrify; I began to comprehend the tendency of madness to eddy about one idea, and the loss of power to abstract, or to exercise many other intellectual acts, was in due proportion to the degree in which the biliary system seemed to suffer. The power of the biliary functions to effect and modify the power of thinking according to the degree in which they were in themselves affected, and in a way far different from the action of good or bad spirits, was prodigious, and gave me a full revelation of the way in which insanity begins to collect and form itself. During all this time my head was unaffected. I am now more than ever disposed to think that some affection of the liver is in most cases the sole proximate cause, or if not, an indispensable previous condition of madness.

He approached this same idea in another article,[8] in which he simultaneously manifested a sympathetic understanding of the problem of mental aberration. Quoting from the popular maxim of the poet Dryden to the effect that "great wits to madness sure are near allied," he went on to differ with the opinions of those who believe that mad people are dull and wearisome. Continuing his dissention, he said:

> Where madness is connected, as it often is, with some miserable derangement of the stomach, liver, etc., and attacks the principle of pleasureable life, which is manifestly seated in the central organs of the body (i.e., in the stomach and apparatus connected with it), there it cannot but lead to perpetual suffering and distraction of thought; and the patient will be often tedious and incoherent. Where this principle of pleasure is not attacked, madness is often little more than an enthusiasm highly exalted; and the madman becomes, if he be otherwise a man of ability and information, all the better as a companion.

The following truism has found expression in many different forms, and is in accord with the conception of psychotic processes being no more than exaggerations of the so-called normal[9]:

> Not one man in a hundred is perfectly sane even as to his mind. For though the greater disturbances of the mind do not take place in more than one man of each thousand, those slighter shades that settle on the judgment, which daily bring up molesting thoughts such as a man would gladly banish, thoughts imperiously irritating at the moment, and wearing to the animal spirits, these derangements are universal.

An appropriate quotation by De Quincey is an apt close to this summary of his knowledge of psychiatry[3]:

"The fine saying of Addison is familiar to most readers, that Babylon in ruins is not so affecting a spectacle, or so solemn, as a human mind overthrown by lunacy."

### HYGIENE

It is the duty of every man, De Quincey urged,[9] to cultivate his own well-being, for "in this life the elementary blessing is health." In order to be the proper master of his own purposes, he must constantly endeavor to keep in the best of physical condition. He added:

> It is true that, by possibility, some derangements of the human system are not incompatible with happiness. But the ill health should not go beyond a luxurious disposition. Inflammatory action, in its early stages, is sometimes connected with voluptuous sensations. But these states, as pleasurable states, are transitory. All fixed derangements of the health are doubly hostile to the moral energies.

That physical states determine the mental and moral attitudes is manifest on the face of the declaration. According to De Quincy's further definition, it was not so much by loss of time that ill health detracts from the serviceableness of a man, as by its lingering effect upon his temper and animal spirits. Every impulse of bad health, he stated, untunes some fine string in the delicate instrument of human volition. Thus no man can be efficient in all regards unless, through health, he commands his bodily powers and is not commanded by them.

The laws of health, to his way of thinking, are very elementary, and especially simple to follow:

> It is required only that a man should open his eyes, to perceive the great elementary forces which support health. They are these: 1. the blood requires motion; 2. the great central organ of the stomach requires exercise and adaptation of diet; 3. the nervous system requires regularity of repose. In those three functions of sleep, diet, exercise, is contained the whole economy of health. As regards the first point, it is probable that any torpor, or even lentor in the blood, such as scarcely expresses itself sensibly through the pulse, renders that fluid less able to resist the first actions of disease. As to the second, a more complex subject, luckily we benefit not by our own brief experience exclusively; every man benefits by the traditional experience of the ages, which constitutes the culinary experience in every land and every household. As to the third head, sleep, this of all is the most immediately fitted by nature to the relief of the brain and its exquisite machinery of nerves.

Dryden, in one of his poems telling of the havoc man has wrought on himself by lack of exercise, decried those who are constantly calling upon physicians to bolster them up, by averring that "God never made his work for man to mend." De Quincey, however, took issue with this attitude, protesting that neither physician nor patient had any such presumptuous fancy. Medicine is taken to mend the injuries produced by our own follies.[9] He stated to support this contention:

> Even in these days of practical knowledge, errors prevail on the subject, which are neither trivial nor of narrow operation. Universally the true theory of digestion, as partially unfolded in Dr. Wilson Philip's experiments on rabbits, is so far mistaken and even inverted, that Lord Byron, when seeking a diet of easy digestion, instead of resorting to animal food broiled and underdone, which all medical men know to be the most digestible food, took to a vegetable diet, which requires a stomach of extra power. It is also a common mistake to suppose that, because no absolute illness is caused by daily errors of diet, these errors are practically cancelled. Cowper, the poet, delivers the very just opinion that all disorders of a function (as, suppose, the secretion of bile), sooner or later, if not corrected, cease to be functional disorders, and become organic; that is, in plain English, beginning with injury to the mere office of any organ, they end by attacking its substance.

Time and again De Quincey stressed the function of digestion, errors of which he believed were an immeasurable source of both disease and secret wretchedness. He berated those who boast that they "know not if they have a stomach, and know not what it is that dyspepsy means." These individuals forget, he said, that[10]:

> In thus vaunting their strength of stomach, they are at the same time proclaiming its coarseness, and showing themselves unaware that precisely those whom such coarseness of organization reprieves from immediate and seasonable reaction of suffering are the favorite subjects of that heavier reaction which takes the shape of delirium tremens, of palsy, and of lunacy. Better by far that more of immediate discomfort had guaranteed them less of reversionary anguish. It may be safely asserted that few indeed are the suicides amongst us to which the miseries of indigestion have not been a large recurring cause.

It can be seen from the following that the features of metabolism, to his way of thinking, assume an importance beyond that of a mere physical nature:

> The whole process and elaborate machinery of digestion are felt to be mean and humiliating when viewed in relation to our mere animal economy; but they rise into dignity and assert their own supreme importance when they are studied from another station, viz., in relation to the intellect and temper: no man dares then to despise them. It is then seen that those functions of the human system form the essential habits upon which the strength and health of our higher natures repose; and that upon those functions, chiefly, the general happiness of life is dependent. All the rules of prudence or gifts of experience that life can accumulate, will never do as much for human comfort and welfare as would be done by a stricter attention and a wiser science directed to the digestive system.

### HOMICIDE

One of the most famous of the essays of De Quincey, aside from the Confessions, is "On Murder Considered As One of the Fine Arts." Conceived in a gruesomely humorous style, this burlesque lecture, supposed to have been delivered before the mythical Society of Connoisseurs in Murder, contains sanguinary details in sufficient numbers to satisfy the most extreme Sadist.

Murder, one learns, should not be performed in a gross manner. As befits an art of the highest refinement, more should go to the composition of a fine murder than "two blockheads to kill and be killed." A genteel frame of mind should accompany the premeditation, and the impending disaster should be looked upon as a delightful sort of entertainment. Let us start with the craftsman[11]:

> Mr. Howship (the surgeon), in a work of his on Indigestion, makes no scruples to talk with admiration of a certain ulcer which he had seen, and which he styles "a beautiful ulcer." Now, will any man pretend, that abstractedly considered, Mr. Howship could be enamoured of an ulcer? It is well known he makes war upon all ulcers, and without suffering himself to be seduced by their charms, endeavors to banish them from the County of Middlesex. But the truth is, that however objectionable per se, yet relatively to others of their class, both a murderer and an ulcer may have infinite degrees of merit. They are both imperfections, it is true; but to be imperfect being their essence, the very greatness of their imperfection becomes their perfection. A grim phagedaenic ulcer may no less justly be regarded as having ideals of its own.

The next consideration should be for the victim, and here due discretion is called for:

> The subject chosen ought to be in good health; for it is absolutely barbarous to murder a sick person, who is usually quite unable to bear it. On this principle, no tailor ought to be chosen who is above twenty-five, for after that age he is sure to be dyspeptic. And here, in this benign attention to the comfort of sick people, you will observe the usual effect of a fine art to soften and refine the feelings. The world in general, gentlemen, are very bloody-minded; and all they want in a murder is a copious effusion of blood; gaudy display is good enough for them.

The modus operandi demands particular attention to details[12]:

> With respect to the proper mode of despatching young toothless infants, I always set my face against the use of poison. It is quite evident that poison in such a case is quite needless; you may operate more speedily by a little lavender water. This will be agreeable to both parties,

yourself and the child: pour a few spoonfuls into a slop-basin; hold the little human kitten with its face downwards in this, and it will hardly have time to mew before the trick will be done. Now observe the difference of circumstances with respect to an adult. How pleasing it is to the benign heart, that nature should have provided so vast a gamut in the art of murder. To the philosophic mind it suggests the idea that perhaps no two people ought to be murdered in the same manner. Suppose, for instance, the subject marked for immediate dispatch to be your uncle; a huge, broad-shouldered monster, evidently quite unfit to live any longer. I should say now, that a dose of corrosive sublimate would be the correct thing for him. Phlebotomy would never do with such a bullock as that. He would turn a mill with his blood, and the place of operating would become a mere shambles. If, again, you attempted to repeat on him the experiment that had succeeded with the infant, surprising him and holding him down when washing his face, the refractory ruffian would assuredly break the basin in his struggles: his face would be lacerated; and when his howling had brought the police to his assistance, the streaming blood would give an air of plausibility to his odious calumny, that you had been attempting to cut his throat, whereas he knows, as well as you know, that not a drop of blood would have been spilt, and very little water, had he forborne making so horrid an uproar.

These benevolent homicidal suggestions might well be taken to heart by the irrepressible "artists" of the present generation.

### TUBERCULOSIS

De Quincey had always felt apprehensive of developing pulmonary tuberculosis, inasmuch as his father had died of that affliction. His self-diagnosis shows the observant mind[1]:

> I offered at the first glance, to a medical eye, every symptom of phthisis broadly and conspicuously developed. The hectic colors on the face, the nocturnal perspirations, the growing embarrassment of the respiration, and other expressions of gathering feebleness under any attempts at taking exercise, all these symptoms were steadily accumulating between the ages of twenty-two and twenty-four.

He was of the opinion that all consumption, though latent in the constitution, does not manifest itself as a disease until some form of cold or bronchitis, or similar affection of the chest or lungs, arises to furnish the starting-point. As an exponent of preventive medicine he thought he had approached a method of checking the invidious development:

> Now the one fatal blunder lies in suffering that development to occur; and the one counter-working secret for prearrestment of this evil lies in steadily, by whatever means, keeping up and promoting the insensible perspiration. In that one simple art of controlling a constant function of the animal economy lies a magician's talisman for defeating the forces leagued against the great organ of respiration. Pulmonary affections, if not previously suffered to develop themselves, cannot live under the hourly counter-working of this magical force. Consequently, the one question in arrear is, what potent drug is that which possesses this power? There is none that I know of answering this need but opium.

In the "Life of Sir William Osler," by Harvey Cushing,[15] is found the following reference to the great white plague:

> Let me read you an abstract from DeQuincey, which, while expressing an old, erroneous idea, gives in his strong and characteristic language the terrible, the appalling nature of this annual slaughter:
>
> "Are you aware, reader, what it is that constitutes the scourge (physically speaking) of Great Britain? All readers, who direct any part of their attention to medical subjects, must know that it is pulmonary consumption. If you walk through a forest at certain seasons, you will see what is called a blaze of white paint upon a certain elite of the trees marked out by the forester as ripe for the axe. Such a blaze, if the shadowy world could reveal its futurities, would be seen everywhere distributing its secret badges of cognizance amongst our youthful men and women. Then comes the startling question, that pierces the breaking hearts of so

many thousand afflicted relatives, Is there no remedy? Is there no palliation of the evil?"

And from Osler come these consoling words: "Let us be thankful that we can answer today—There is!"

But the remedy is very remote from the opium upon which De Quincey so fondly and hopefully relied!

### MEDICAL MISCELLANY

*The Sceptic.* There was a certain type of individual, De Quincey declared,[5] who always incited him to harsh words. Viewing the whole body of medical men as ignorant pretenders, this detractor was every day demanding from his own medical attendants some special knowledge, which, had they possessed it, would reasonably classify them as magicians:

"He rated the whole medical body as infants, and yet what he exacted from them every day, as a matter of course, virtually presumed them to be the only giants within the whole range of science."

*Miracles.* The practitioner in Biblical times, according to De Quincey, played the two-fold rôle of physician and missionary. As a healer he has always found the gates of hospitality wide open[13]:

> At least nine in ten of Christ's miracles were medical or therapeutic miracles, miracles applied to derangements of the human system. It would be ridiculous to suppose that Christ would have suffered his time to be occupied, and the great vision of his contemplations to be interrupted, by an employment so trifling (trifling surely by comparison with his transcendent purposes) as the healing of a few hundreds more or less, in one small district through one brief triennium. This healing office was adopted partly as a symbolic annunciation of a supreme healing, already expressed in the name Iesus, from the Greek verb for healing; chiefly, however, as the best means, in an eastern land, of advertising his approach far and wide, and thus convoking the people to his instructions. From Barbary to Hindustan, from the setting to the rising sun, it is notorious that no traveling character is as certainly a safe one as that of hakim or physician. As he advances on the route, the news flies before him; disease is evoked as by the rod of Amram's son; the beds of sick people, in even rank, are ranged along the roadsides; and the beneficent dispenser of health or relief moves through the prayers of hope on the one side, and of gratitude on the other. Well may this character be a protection; for is not only every invalid in the land his friend from the first, but every one who loves or pities an invalid? In fact, the character is too favorable, because it soon becomes burdensome; so that of late Englishmen have declined its aid: for it impedes a man's progress; and exposes him to two classes of applications, one embarrassing from the extravagance of its expectations (as a man should understand doubtful or elaborate symptoms at a glance), the other degrading to an Englishman's feelings, by calling upon him for aphrodisiacs or other modes of collusion with Oriental sensuality. This medical character, this all-persuasive title of hakim, the Apostles and their delegates adopted; using it both as a trumpet of summons to some central rendezvous, and also as the best means of opening the heart to religious influences, the heart already softened by suffering turned inwards by solitary musing; or melted, perhaps, by relief from anguish, into fervent gratitude.

*Faith Healing.* De Quincey had encountered several varieties of folk-lore therapeutics that are of some interest[7]:

> The dreadful taint of scrofula, according to the belief of all Christendom, fled at the simple touch of a Stuart sovereign . . . By my own experience, again, I know that a styan (as it is called) upon the eyelid could be easily reduced, though not instantaneously, by the slight application of any golden trinket . . . Warts upon the fingers of children I had myself known to vanish under the verbal charm of a gypsy woman, without any medical preparation whatever.

*Nostrums.* In 1739 a famous impostor, Joanna Stevens, had actually succeeded in having her remedy for the stone purchased by Act of Parliament for the good of the public. The recipe was subsequently revealed as a mixture of egg-shells, garden-snails, swine's cresses, soap, and such vegetable ingredients as burdock seeds, hips and haws. Commenting upon a certain Hartley, who had written a medical tract upon this nostrum, De Quincey declared[14]:

> Hartley was the person upon whose evidence the House of Commons had mainly relied in giving to that same Joanna a reward of five thousand pounds for her idle medicines, an application of public money not without its use, in so far as it engaged men by unselfish motives to cultivate the public service, and to attempt problems of very difficult solutions; but else, in that particular instance, perfectly idle, as the groans of three generations since Joanna's era have too feelingly established.

*Craniology*. Dr. Percival, an expert craniologist and well-known literary physician, had examined De Quincey's two and a half year old sister, and pronounced her skull to be the finest in its development of any he had ever seen. Shortly afterwards she died of hydrocephalus, concerning which disease De Quincey remarked[14]:

> The premature expansion of the intellect in cases of that class is altogether morbid, forced on, in fact, by the mere stimulation of the disease. Not the disease may have always caused the preternatural growth of the intellect; but inversely, this growth of the intellect coming on spontaneously, and outrunning the capacities of the physical structure, may have caused the disease.

*Anecdotes*. De Quincey related a story while giving some practical advice on the workings of the National Temperance Movement, that is significant of certain features of abstinence. Dr. Darwin, a physician practicing in Derbyshire, was a prohibition fanatic, who, when other men called for wine, would always call for cream[10]:

> Suddenly on one fine golden morning, the Doctor was attacked by a spasmodic affection. A glass of brandy was earnestly suggested. Thirty years having fled since the Doctor had tasted alcohol in *any* shape, it was imagined that old cognac would have a magical effect. But no. The Doctor called loudly for cream; and alas! Death called still more loudly for the Doctor.

Even Royalty, no less than the Profession, must respect the dictates of common sense. It was related by De Quincey[11] that a dauphin of France, when admonished against unduly taking a risk of exposure to smallpox, haughtily retorted:

"Had any gentleman ever heard of a dauphin killed by smallpox?"

No, none had. And none the less this dauphin was!

De Quincey never pretended to possess a scientific knowledge of medicine; his field of activity was exclusively literature. Nevertheless, these variegated observations, sometimes accurate, sometimes fanciful, demonstrate that he could write and reason interestingly on matters pertinent to the practice and philosophy of medicine.

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# THE SPONGE*

## ITS EFFECT ON THE MARTYRDOM OF JAMES KING OF WILLIAM, THE FORMATION OF THE SAN FRANCISCO VIGILANCE COMMITTEE OF 1856, THE EXECUTION OF CASEY AND CORA FOR MURDER AND THE TRIAL OF EDWARD McGOWAN FOR COMPLICITY

*By* GEORGE D. LYMAN, M.D.

SAN FRANCISCO

THE shooting of James King of William was one of the most dramatic incidents in the history of San Francisco. From his blood, as from that of a martyr, sprang a great political and social revolution. He was a martyr, just as much a one as any of those valiant figures of the past who died for the church. He gave up his life that the principles of truth, honesty and justice might prevail and although his fame rests on their solid foundation, nevertheless death and fate played a conspicuous part. For although he was a hero, it was in defeat that he attained victory. Death is usually the price of martyrdom and it was so with James King of William. He achieved in dissolution more than he could have attained in life; fate often depends on some illogical act and frequently hangs by a thread. For instance, the cackling of geese once saved Rome; a boiling lidded pot disclosed the potential possibilities of steam; a flying kite led to the discovery of electricity. Perhaps a sponge,—a surgical one, unleashed the San Francisco Vigilantes, of 1856 and elevated James King of William to martyrdom. I shall leave the conclusion to you.

In 1856, San Francisco had a population of 75,000 made up of merchants, artisans and adventurers. The adventurers, if they did not predominate in numbers, at least preponderated in influence. The discovery of gold in 1848 and the sudden lure of quick riches in California had recruited here in a few years the offscourings of Europe and America. Along with the pick of mankind came ex-convicts, thieves, burglars, pimps and murderers. All who could procure passage or walk, flocked to these shores. Having arrived, few of them went to the gold mines. They didn't like hard work. They liked better the cities, the saloons, the gambling hells and the cribs and brothels of the unfortunate, where they could fleece, dupe, throttle and rob.

They organized themselves into bodies that terrorized the police, the courts and even the peaceful element of the inhabitants. One of these groups, called the "Hounds" or "Regulators," paraded the streets, pillaged, plundered and murdered to suit themselves, so far as the law was concerned, they bought freedom and escaped scot-free. Some of the police were in league with these rascals and assisted them in cheating justice. The law lost its majesty in their hands and became a poor thing that was held up for ridicule and mockery. Trial was a farce. If a man committed murder his chances of avoiding the penalty were numerous: through negligence of the police he was not arrested; if arrested, he escaped before trial; if tried, he escaped through the presence of a perjured confederate on the jury; if convicted he was recommended to the mercy of the court by the jury that convicted him, thus assuring a light sentence; if sentenced to the full extent of the law he was likely to escape from prison. A set of misguided citizens would besiege the governor to commute his sentence or pardon him and as the governor was easily led, he would grant their prayer. The verdict in some cases was fixed long before the proceedings began. Judges in many instances were in connivance with the criminals. In 1856, even Chief Justice David S. Terry of the California supreme court was guilty of attempted murder. He drove a dagger into the throat of an officer sent to arrest one of his adherents. With criminals in the dock, criminals on the jury and criminals seated in the tribunal, what chance had justice, truth, honesty? They were strangled by perjured testimony and professional jurymen whose aim it was to tie up a verdict by hook or crook.

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* Read before the San Francisco Medical Society November 8, 1927, and before the California Historical Society January 27, 1928. The pictures used in this paper are from the collection of Templeton Crocker of San Francisco and are now on deposit in the rooms of the California Historical Society. The books of reference are in the Library of Mrs. Robert Henderson, the Bancroft Library and the California Historical Society.

FIG. 1. SAN FRANCISCO, 1856.

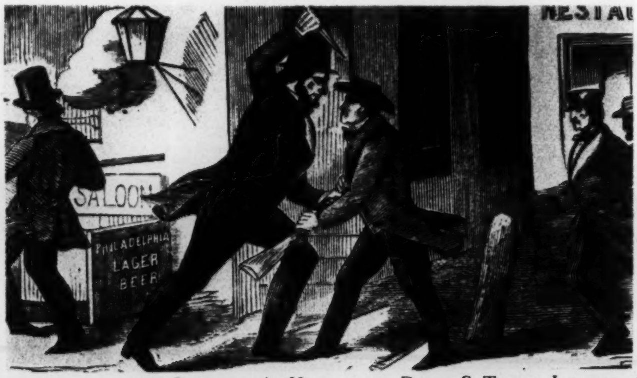

FIG. 2. ASSAULT UPON STERLING A. HOPKINS BY DAVID S. TERRY, JUNE 21, 1856.

Up to 1856, twelve hundred murders were committed in San Francisco. Few of their perpetrators suffered the death penalty at the hands of the constituted authorities.[1] The times were extravagant, out of all proportion to any other epoch, not only in financial matters but in morals. The lust for gold warped men's minds and deadened their responsibilities to one another. Chastity lost its value. The women of the demimonde apparently received as much adulation as the virtuous. The minister and the priest forgot their cloth and vows and gambled with rogues. Distress, illness and death made but slight impression. The dead were buried where they expired. The sick were often abandoned altogether. In this wild scramble for wealth it was each man for himself. To such an irresponsible community murder meant little. It was considered more of a crime to steal a mule than to garrote a human being and ten times more men were hung for that theft than for murder. At that there were more men killed than mules stolen. In many California papers the criminal calendar was posted in the same matter-of-fact way as market reports were listed. Along with the statement of specie, shipments and sales of bacon and cheese, one reads this statistical summation of the killings and hangings for the year 1855:

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[1] Smith, F. M. San Francisco Vigilance Committee of 1856. San Francisco, 1883, p. 33.

FIG. 3. CHARLES CORA.

| | 1st Quarter | 2nd Quarter | 3rd Quarter | 4th Quarter | Total |
|---|---|---|---|---|---|
| Total killed...... | 120 | 99 | 208 | 60 | 489 |
| Hung by Sheriff.. | 2 | .. | 2 | 2 | 6 |
| Hung by mob.... | 8 | 14 | 18 | 6 | 46 |

On account of this laxity it was generally understood that crime could not be punished in San Francisco; that it was a nest of the iniquitous where vice was hatched and virtue raped. The principles which should regulate society were set at naught. No higher motives than self-interest and pecuniary gain inspired those invested with authority. Corruption stalked brazenly through the political and financial life of the city. Criminals and prostitutes controlled men in high places. Murders of the most dissolute character went unpunished, often unheeded.

An instance of this was Rod Backus, whose family were auctioneers and substantial, self-respecting people. Young Rod, however, was wild and dissipated. He was an habitué of saloons and the red-light district and in love with a young girl named Jennie French who made her livelihood as a prostitute and lived in Staut's Alley with the rest of the demi-monde. It was Backus' custom to visit her nightly. One evening at dusk as he approached her house, he saw her standing in her doorway on the second floor at the head of an iron stairway. On the opposite side of the street walking toward Jackson Street was a man. Backus had never seen him before and as he dashed up the stairway Jenny said to him "Rod, that fellow has insulted me; shoot the son of a —." At the word Backus drew his revolver. Just at that moment the stranger happened to turn and look at him. Although he was an utter stranger, Backus fired. The bullet hit his victim full in the face and the man fell dead.[2] Rod was tried and convicted of murder and sentenced to be hung. Then his friends got busy. The case was appealed and he escaped with a few years at San Quentin. Many felt the sentence was an outrage against Backus but not against the law.

On November eighteenth, 1855, General William H. Richardson, United States Marshall of the Northern District of California, was murdered on Clay Street near Montgomery by one Charles Cora, an Italian gambler. Cora was the paramour of Belle Cora, the madame of a notorious house of ill-fame and although unmarried she did him the honor of assuming his name. In spite of her profession she was quite a remarkable woman and was devoted to the man she supported. In fact it is said she instigated the crime. She was very beautiful and besides the power that comes of beauty she was the mistress of riches, both of which she flaunted on the gayest thoroughfares. At every public occasion she was among those present and had a retinue of senators, judges and citizens at her beck and call. Her profession countenanced, she became the darling of her public and as such she required and exacted her due. Once General and Mrs. Richardson met her at the theatre but failed to pay her the homage she expected. Mrs. Richardson was exasperated over Belle's attitude toward her. That night Cora met the General, who at the time was under the influence of liquor and made some trifling remark. The General said, "What is that you say? I will slap your face for it." Before anything could happen they were separated by friends but the next night the quarrel continued and in defending himself from a murderous assault, Cora killed Richardson. He was taken to jail and was brought to trial but it was generally understood that he would never be punished and bets were made by the onlookers that so and so on the jury would vote for acquittal. So sure was he of it that he pleaded not guilty and did not ask for mercy. He was especially confident as Belle had engaged no less a personage than Colonel E. D. Baker, one of the most noted lawyers in San Francisco to defend him, giving him five thousand dollars from her earnings as a retainer's fee. Baker did not want the case but such was Belle's personality that he did not dare refuse. When the trial came off Baker made a notable speech and the jury became confused between his plea and the arguments that poured from the prostitute's purse and the prisoner went back to jail to await another trial.

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[2] The Vigilance Committee of 1856 by a Pioneer California Journalist. San Francisco, 1890, pp. 22–23.

The time expired from January to May, and Cora nestled in the bosom of the law as peacefully as he had in the arms of his mistress and probably would have continued so indefinitely had the community not been electrified into action by another outrageous occurrence.

It is an inevitable provision of nature that wrongs long continued, work out their own remedy. California criminals, though they for a while postponed the issue, could not avert the operation of this universal law. At this stage in San Francisco's moral degradation James King of William appeared upon the scene as the appointed instrument. He was then thirty-four years old and in the heyday of his manhood.

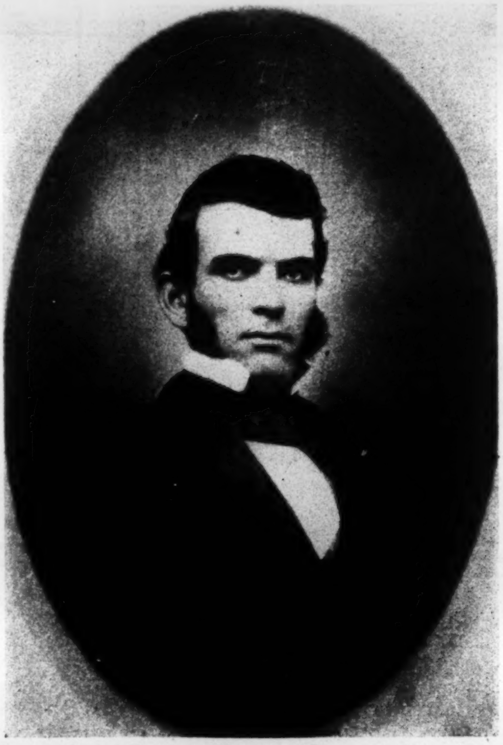

FIG. 4. JAMES KING OF WILLIAM. (COURTESY MRS. ALICE KING DUTTON.)

He was a tall, handsome man of commanding presence, with dark complexion, large piercing eyes, aquiline nose, black bushy whiskers and he had a well-shaped head set on slightly stooping shoulders. He was well educated and was familiar with the Latin classics and with French and Spanish, both of which he spoke fluently. He was born at Georgetown, District of Columbia.

While still a youth and because there were several James Kings in his native town he assumed the term "of William" his father's name, to distinguish himself from the others. Early in his career he was connected with *Kendalls' Expositor*, a Democratic campaign paper and subsequently with the Washington *Globe*. In 1841, when he was nineteen years old, he gave up newspaper work to enter the banking establishment of Corcoran and Riggs, in Washington. In these two callings, the newspaper and the bank, we have the cause and the effect of his subsequent career. It was the failure of the banker and the crookedness and rottenness of California financiers that produced the editor and the reformer.

In 1848 his health broke down and he determined to migrate to California. This was before the discovery of gold so that he was not attracted by its glitter nor did he after his arrival permit it to pollute his fingers. He came to join his brother who had already reached the Pacific in Colonel Fremont's expeditionary forces. Their plan was to go into business together but by the time that James King arrived in California, in 1848, his elder brother had already perished.

On November seventeenth, 1849, finding that he was physically unfit for the life of a miner, he established the "Exchange and Deposit office of James King of William," on Montgomery Street between Clay and Merchant Streets, which was one of the first banks in San Francisco. By 1854 he was one of the most affluent San Franciscans. He was rated as a millionaire and was a pillar in the community, sponsoring good schools, observance of the Sabbath and a clean civic atmosphere in which to rear his children.

In 1855, by the betrayal of a business associate, he underwent a sudden reversal of fortune and almost overnight was reduced from affluence to poverty. His banking house was closed. He kept nothing from his creditors, even surrendering the homestead, allowed by our laws, that sheltered his wife and children. He then entered the banking and express firm of Adams and Co. which had numerous branches scattered throughout California, with the understanding that his liabilities would be met in full. He had not been long in their employ before he discovered that they were insolvent and warned their San Francisco manager, I. C. Woods, to save it from ruin and the depositors from heavy losses. The latter only laughed at him for his pains and went on making heavy loans. Late in February, 1855, the inevitable happened. The firm closed its doors with a tremendous crash, leaving thousands of King's friends and acquaintances in every part of the state financially ruined. From this blow James King again emerged with a spotless reputation but with iron in his soul. He was furious with a state of society so rotten at the core that it offered no form of redress from these evildoers. Satisfied that there was no prospect of reformation save by open denunciation of these criminals he determined to become a reformer and to open a crusade against them by issuing a newspaper that would be incorruptible. Some of his friends raised the necessary funds and set him up on Merchant Street as the editor. He called his sheet the *Evening Bulletin* and dedicated its columns to the principles of right and justice,[3] determined to cleanse the sewers of San Francisco society and to purge the city from the leeches that thrived upon her. On the eighth of October, 1855, the first edition appeared.

It was clear enough from the beginning that in entering the arena of journalism he did so with the idea of exposing the swindlers who had ruined him, wrecked Adams and Co. and other banking houses and defrauded thousands of depositors. He directed a pitiless attack upon them and showed them up in all their rottenness. Nor did he stop there. He was soon making war on wrongs in general and launching his broadsides against gamblers, pimps, corrupt state, county and city officials. From the first his editorials exhibited a quality of courage touching on desperation. He wielded his scourging pen as fearlessly as a duellist wields a sword. He dared to say what others feared to think. All those who had made themselves criminally conspicuous in public affairs he tore in shreds with almost savage ferocity. Every day he lunged his pen at the vitals of infamy, now here, now there until the evil-doers quaked in their boots. Likewise he scattered thorns upon the bench of criminal judges and made derelict officials drink gall. To all who polluted the springs of virtue and preyed upon public morals he was a thorn in the flesh. Opposition and danger only roused him to bolder efforts. Frequently he was threatened by personal enemies and political cutthroats and again and again he was warned by his friends that sooner or later his life would pay the penalty of his temerity. Yet steadily and fearlessly he continued his course and that at a time in California when the slightest insult was answered with a bullet. From the first number of the *Evening Bulletin* until the last one which he edited, his life hung upon a thread; for no man could attack San Francisco's constantly occuring deeds of darkness and crime without risking his life and limb every time he did so. No man could continue throwing matches into dynamite and not expect an explosion, and that is what King was doing daily. He well knew the dangers that surrounded him. His zeal ran into the wildest fanaticism and he acted like a man who had nothing to lose. Yet he often gazed at his wife and children and almost faltered when he remembered how soon they might hear the signal of his death. But he recollected in these moments of despondency the justice of his cause and dedicated his life to it.

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[3] Shuck, Oscar T. Representative and Leading Men of the Pacific. San Francisco, 1870, p. 563–579.

Once, to a threat that he would not be in existence longer than twenty days he replied through the columns of the *Bulletin* of November twenty second, 1855:

> War, then, is the cry, is it? War between the prostitutes and gamblers on one side and the virtuous and respectable on the other: War to the knife, and the knife to the hilt: Be it so, then, gamblers of San Francisco, you have made your election, and we are ready on our side for the issue.

Again, a gambler, by the name of Selover challenged him, but King denied him the privilege of a duel and told him through his columns where he might be found every afternoon. "We pass," he wrote, "about half-past four to five o'clock along Market Street from Fourth to Fifth Street. The road is wide and not so much frequented as those streets farther in town. If we are to be shot or cut to pieces, for heavens sake let it be done there."

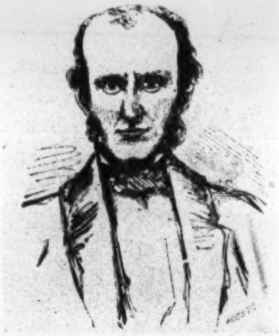

FIG. 5. JAMES P. CASEY.

Thus at the beginning of the battle it will be seen that he was game and fearless and determined to break up the combination of political pimps and murderous demagogues which held San Francisco in their grip. And he did it. From the outset his paper was a great success. At first his readers were aghast, then he was applauded by the better element of society and feared and threatened by the other. But threats did not hinder his pen if he had anything to write. Neither wealth, position, nor political influence deterred him. He could not be bought or sold, cajoled or browbeaten and he answered all menaces by saying "God help the man who attacks me." This was interpreted differently by different criminals. Among others was one James P. Casey, a supervisor, who had arrived at a powerful position politically through the medium of the stuffed ballot-box in which work he had been aided and abetted by Yankee Sullivan, the pugilist and Ned McGowan, the ubiquitous. These, with several others of a like ilk, were the gang of which he was the leader. Through the help of these fellow conspirators, Casey had elected one California governor and many minor officials fraudulently and was in the custom of doling out the political gifts, within his power, to the highest bidder and halving the spoils with the winner. King knew all this and more. When Casey, who was editor of the *Sunday Times*, attacked him through his columns, the *Bulletin*, by way of reply, assailed him for his corrupt methods and threatened to unmask him as an ex-convict who had served eighteen months at hard labor in Sing Sing for robbing his mistress. For such was the history of the man who brought to a blazing heat the fires that ultimately purified the city. King is said to have received this information from Ned McGowan, a police judge.

FIG. 6. EDWARD McGOWAN.

Casey thought his past was a closed book and was furious when he read this threat. Dropping the paper, he stepped quickly over to the editorial room of the *Bulletin* at Merchant and Montgomery Streets. Without knocking, excited and out of breath he dashed into the editor's sanctum and accosted King. "What do you mean by that article?" he demanded. "What article?" asked King. "That which says I was formerly an inmate of Sing Sing prison." "Is not that true?" asked King. "That is not the question, "replied Casey, "I don't wish my past acts raked up; on that point I am sensitive!" "Are you done?" asked King. "There is the door: go! Never show your face here again!"

In the door Casey paused and striking his breast with his clenched fists exclaimed, "If necessary I shall defend myself!" "Go!" exclaimed King, and Casey went down the stairs to plot, it is said, with Ned McGowan to destroy King. Such was Ned's type, he set King on Casey and then Casey on King![4]

This was at four o'clock, May fourteenth, 1856. At five o'clock the same evening Casey lay in wait at the corner of Montgomery and Washington Streets determined to exact reparation from the editor. As King passed he threw off a short cape, a talma, that concealed a cocked pistol in his hand and cried, "Come on" and instantly fired. King wavered for a moment and exclaimed, "Oh God, I am shot" and staggered into the Pacific Express Building where he fell into the arms of a bystander and was placed in a chair. From there he was later transferred to a mattress laid on top of a counter. Montgomery Street filled with spectators and the office of the Pacific Express with excited onlookers. Dr. R. K. Nuttall,[5] a licentiate of the Royal College of Surgeons, Ireland, was the first doctor to reach his side and make an examination of the wounded man. King was in syncope from loss of blood and the doctor noted great quantities of it about him, that his apparel was saturated with clots and as he tore open his clothing he discovered that the bullet had entered his left chest, along the outer third of the clavicle, about an inch below it and just over the first rib and that the blood which flowed from it was venous in color; that there was no pulse in the left wrist, and but a feeble one in the right, that his extremities were cold and that he was profoundly prostrated. To stop the hemorrhage and ascertain the course of the bullet, he introduced a finger into the wound and found its course upwards, inwards and backwards. The great question then and afterward was whether the subclavian artery was severed.

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[4] Ned had an unsavory past of his own. If he plotted with Casey to destroy King it was probably with the idea of getting the editor out of the way and saving the shreds of his own reputation.

He came from Philadelphia and came of a good family. His nephew, Rear Admiral John N. McGowan, United States Navy, fired the first gun of the Civil War at Fort Sumter in 1842. He was a member of the Pennsylvania legislature but was forced to resign when he became involved in a stabbing affray with an editor. Subsequently he became superintendent of police for an outlying district in Philadelphia, during which time he cultivated the friendship and society of thieves and villains and became involved in the notorious Chester County bank robbery and resulting scandal. After a wild getaway and subsequent capture, disguised as a drover, he was given a form of trial. At length he escaped to California arriving there in 1849, where he found a fertile field for his particular kind of genius. Allying himself with the Broderick wing of democracy he became a justice of the peace and subsequently associate justice of the court of sessions and through the graces of Governor Bigler, state commissioner of emigrants. (Carl Wheat, *California Historical Quarterly*, VI, No. 1, 5–7.)

Dr. R. Beverly Cole[6] arrived about this time and finding King pulseless, vomiting and in shock, applied synapisms or mustard plasters and heat to his extremities to reinstate his circulation. King rallied sufficiently to grasp his hand and exclaim "Oh

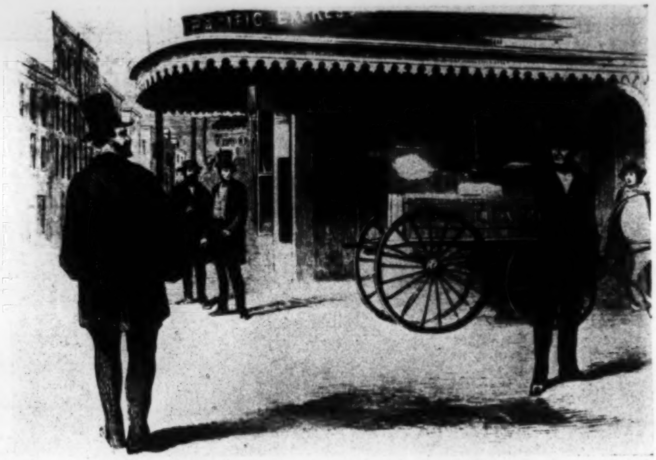

FIG. 7. THE SHOOTING OF JAMES KING OF WILLIAM.

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[5] M. D. (Aberdeen, 1847), L. R. C. S. (Ireland, 1847) arrived in San Francisco in May, 1850 in company with his friend, Dr. Robert McIntosh. They came from Australia and camped in a tent at North Beach. Dr. Nuttall died, the twenty-first of May, 1881 in San Francisco, and Dr. McIntosh died there the twenty-eighth of October, 1894. [Geo. H. F. Nuttall. Cambridge, England, 30 March 1924].

[6] R. Beverly Cole by birth was a Virginian, by education a Kentuckian, having been a medical student at Transylvania University and later at the Kentucky school of Medicine at Lexington, Kentucky. He took his final medical degree at the age of twenty at the Jefferson Medical College, Philadelphia. This was in 1848. He practiced in Philadelphia for several years before coming to California. He arrived in San Francisco aboard the "Cherokee" in 1852. He was a personality who immediately made himself felt, some said conspicuous. In fiber he was a southerner through and through and identified himself with the southern element which was very strong in San Francisco before the war of 1861. He was president of the California State Medical Society; president of the American Medical Association; dean of California's first medical school, that of the University of the Pacific; dean of the Toland Medical School and the first dean of the Medical College of the University of California and Surgeon-General of the Vigilantes. One of the most distinguished physicians in San Francisco for fifty years.

Sara C. Glass, Secretary to the Dean, Jefferson Medical College, wrote, on Jan. 16, 1928:

Richard B. Cole, of Philadelphia, attended two sessions in Jefferson Medical College and received the degree of Doctor of Medicine from Jefferson Medical College, March 28, 1849. He was never on the faculty of this institution.

Cole, in the name of God stay by me"! Then Cole, too made a digital examination of the wound and discovered that the bullet had come out along the posterior wall of the axilla. While Nuttall and Cole were working over King they were joined by Dr. H. M. Gray and Nuttall suggested the propriety of putting a plug into the wound until Mr. King could be moved to more suitable quarters. The hemorrhage had to a great measure ceased and Nuttall on making another examination could feel a clot in the wound but felt that the least movement might start the bleeding again. At the time there was only a large piece of white sponge available. As the hemorrhage had stopped, Cole objected to anything being inserted in the wound for fear of possible contingencies. If anything were used he preferred lint, feeling that sponge was an improper material, as it might become organized during the healing or putrefaction might follow. He was overridden by the others, however, and a sponge, the size of a goose egg, too big for the wound, was dipped in water and shoved with considerable pressure into it and wet compresses and bandages applied.

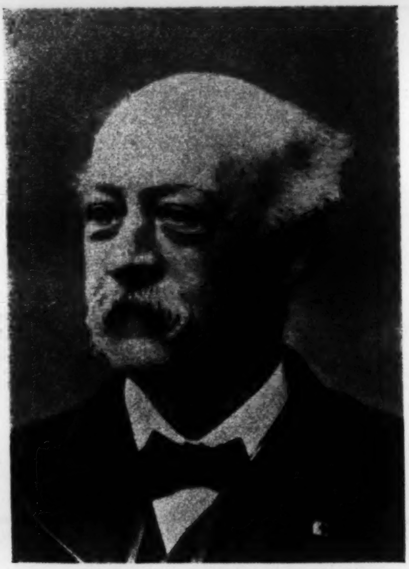

Fig. 8. R. Beverly Cole.

At eight o'clock that night King's condition was so critical that Dr. H. H. Toland[7] was called in consultation. When he arrived there was an immense throng within and without the Pacific Express Building and he had to fight to get to the entrance and elbow his way to the bedside. The room where the sick man lay was rife with tobacco smoke and crowded with people. He estimated that twenty physicians were hovering about King taking his pulse,

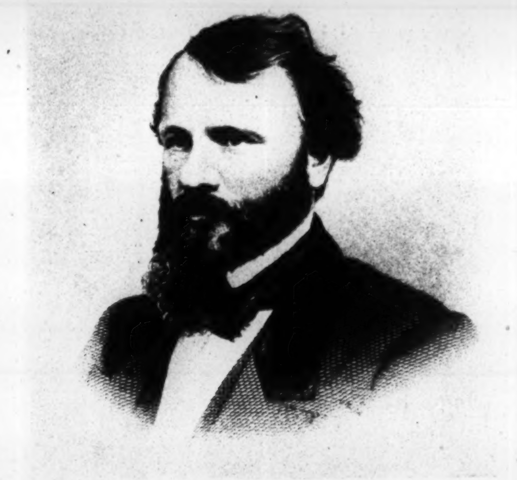

Fig. 9. Dr. H. M. Gray.

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[7] Hugh Toland was born on a plantation at Guilder's Creek, Newberry County, South Carolina, in 1806. His father was a wealthy planter and banker and gave his son a thorough classical training in Latin and Greek and sent him to Lexington to the University of Transylvania, where he graduated in medicine in 1828 at the head of a class of one hundred and sixty students. He supplemented this university training by two years in the lecture rooms and hospitals of France where he studied with Dupytren, Lisfranc, etc. and gave valuable assistance during the cholera scourge that decimated France in 1832. On his return he practiced in Columbia, South Carolina but with the discovery of gold in California he migrated to those shores in 1852 and soon had the most considerable practice in San Francisco. In 1864 he founded, at his own expense, the Toland Medical School and housed it in a handsome stone structure at the corner of Pfeiffer and Stockton Streets. In 1872 he deeded his medical school to the University of California but retained the chair of surgery up to the time of his death.

administering stimulants and making numerous suggestions. Dr. Hammond, his personal physician, was in charge. On account of the general confusion Toland did not make an examination but found that Mr. King had not rallied and was almost pulseless particularly on the left side and was vomiting. On account of the pulse he was convinced that the left subclavian artery was severed, at least injured, and fearing sloughing and renewed hemorrhage he and the others felt that it was inadvisable to leave King without a surgeon in attendance. Hammond agreed to stay until one A.M. and Cole volunteered to relieve him at that hour. Several times during that night's vigil, King turned to Cole with the question, "Is there no hope for me?" He should have said for San Francisco for the thing that troubled him most was not his life but his plans. He could reconcile himself to death but not to the murder of his high hopes into which he had thrown his whole soul. Such was the state of affairs within the Pacific Express Building during the night of May fourteenth.

If there was confusion within, without the excitement amounted to frenzy. After the shooting, Casey was hustled off to the station house and locked up. In an adjoining cell was Charles Cora. When Cora saw him and learned what he had done he exclaimed: "You have sealed the fate of us both!" In less time than it takes to tell, the fatal corner was densely packed with human beings and cries of "hang the son of a ———!" "hang all the gamblers!" "run him up to a lamp post!" filled the air, and a great crowd started for the station house. Sensing the danger, Casey was removed to the county jail on Broadway and the militia under Major Isaac Rowell was summoned. "Take the jail!" yelled the mob that besieged the doors and several of their spokesmen appeared on the neighboring balconies and made flaming appeals to avenge the blood of King. The question was put to them whether they were ready or not and the crowd responded with a tremendous "Aye!" It was proposed that they should gather at nine P.M. on the Plaza. That evening there and later at 41 Sacramento Street, the Vigilance Committee was reorganized and remained in session the greater part of the night. Cole was made Surgeon General on the staff of the Grand Marshall of the Vigilance Committee with some eighty physicians under him. This honor excited considerable envy in the breasts of the other surgeons as they were influenced by a like ambition.

FIG. 10. DR. H. TOLAND.

Back in the sick room Hammond called a consultation for the next morning and requested Gray, Bertody and Toland to attend. It convened at seven A.M. Cole had been up the greater part of the night with King and without addressing anyone of the four surgeons in general but all in particular gave it as his opinion that the sponge should be removed and the subclavian taken up if cut. Neither Gray, Bertody, Hammond or Toland looked at him or acted as if they had heard. Then Nuttall called Hammond aside and said he had inserted the sponge as a temporary measure and thought that now it should be removed. Hammond replied, "Well I guess

I have some crude notions on the subject myself."

With that he withdrew to a corner of the room and beckoned Toland, Bertody and Gray to join him making it evident to Cole and Nuttall that they were not wanted.

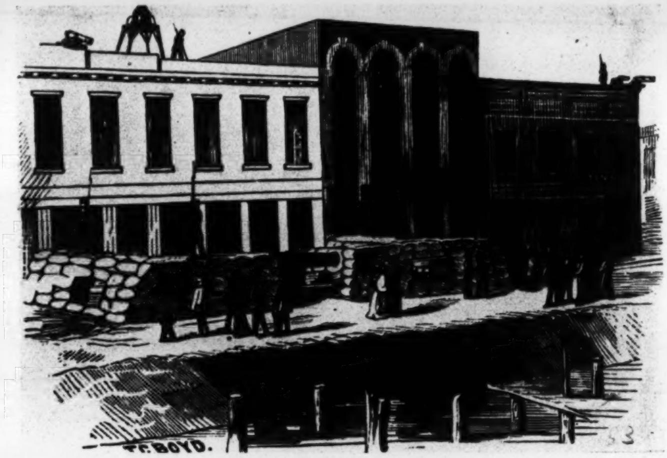

FIG. 11. FORT VIGILANCE.

Cole was chagrined over their lack of courtesy especially as the wounded man besought him to remain with him and he withdrew from the case, leaving the four surgeons to carry it on. During the consultation it was decided to remove the injured man on a litter to Montgomery Block and as there was only a slight pulse in the left wrist and as there was still danger that the subclavian artery was injured, they therefore agreed to leave the sponge in the anterior wound and arranged a horseshoe tourniquet to be applied to the posterior one on the least evidence of bleeding.

Without the sick room, there was an eager populace continually anxious to know about King's prospects for life and the surgeons were forced to issue frequent bulletins *and these announcements good or bad had a vast affect on the surging crowd assembled there as well as on subsequent events.*

*At the end of the first day, May fifteenth,* the bulletins announced that the left arm was entirely paralyzed, cold, blue and swollen; that it was pulseless and without sensation or motion; that the hemorrhage had stopped but that the posterior wound was draining a serous fluid; that it was still feared that the subclavian artery was cut but that Mr. King's condition was too precarious to permit of an operation.

Sensing the gravity of King's condition the mob adjourned to the Vigilance Committee rooms in a vast crowd.[8] So anxious were they to enroll themselves in its ranks that they waited their turn in a line which extended blocks down to Sansome Street. All those who registered received a certificate of membership. At the jail the warden was afraid of an attack. Cannons were in requisition and sentries marched up and down. Casey was alarmed at the outside pressure especially when Major Isaac Rowell and the militia refused longer to guard the jail, disbanded and joined the Vigilantes.

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[8] Fort Vigilance, the headquarter rooms of the Committee, was embraced within the block bounded by Front, Davis, California and Sacramento streets. The rooms proper were on Sacramento Street and were protected by a sand bag breastwork, which was thrown up about ten feet high, six feet thick and was twenty feet from the building. On the roof was an alarm bell of 700 pounds weight and several cannon. The ground floor was used for field pieces and heavy ammunition. The small arms were placed in racks in the rooms above.

Such is a faint outline of Fort Gunny Bags, which was the center of more power and terror to the evildoers than all the courts or governors of California because it could add to its physical strength the entire moral force of the state.

*At the end of the second day, Friday, May the sixteenth,* King's physicians issued a bulletin saying their patient's condition was critical and that serious apprehensions were entertained for his safety. It was said that the posterior wound was discharging pus.

As this announcement appeared on the bulletin board the most intense excitement prevailed. The street leading to his room was thronged and had to be roped off.

The crowd about the Vigilance rooms, anxious to enroll themselves, became enormous. It was estimated that the Committee now numbered 5000 persons. At the jail sentinels marched up and down the walls with muskets on their shoulders. Casey was said to feel very insecure. For fear that he might escape in disguise the Vigilance Committee posted a deputation of their men to watch the exits.

*At the end of the third day, Saturday, May seventeenth,* the surgeon's bulletin announced that Mr. King passed a comfortable night and day; that his left breast was swollen but that the prospects of his recovery were decidedly good. Dr. Toland, for the purpose of satisfying the public, requested a fifth consultant and Dr. John S. Griffin,[9] an army surgeon, was summoned from Los Angeles.

The Vigilance Committee were in session to a late hour that night but the excitement about the rooms abated.

*Fourth day, Sunday, May eighteenth,* the bulletin board announced that Mr. King was not so well; that his right pulse was rapid; the left imperceptible; and that his left breast was badly swollen. Dr. Griffin arrived that day from Los Angeles. At the consultation that followed Toland and Gray wanted to remove the sponge and take up the artery. Griffin objected. The left subclavian and danger of hemorrhage were still the bugaboo. The left breast was so swollen that an incision was made to relieve it and considerable pus drained off. After the operation it was said King's pulse became more rapid and that his expression was more anxious and that his physicians were more apprehensive than ever. At Fort Vigilance there was no falling off in interest but excitement had given place to cool determination. However those for law and order were anxious that Governor Johnson be summoned from Sacramento to quell the Vigilantes, but when he arrived, talked with the leaders and saw how determined they were, he ended by agreeing with them, much to the disgust of those who had summoned him.

At twelve o'clock noon that fourth day there was a great clanging of the bell on Fort Vigilance. The doors opened. In the twinkling of an eye 2600 men divided into 26 companies and armed with glistening bayonets were marching solemnly up Sacramento Street. A great stillness pervaded the movement. Aside from the tramp of feet and the commands of officers, not a sound was uttered. They passed up Sacramento to Montgomery, up Montgomery to Pacific, up Kearney to Broadway to the jail. Here they formed a hollow square, 10 men deep, facing it. A cannon was planted in the street, its muzzle aimed at the entrance (to the jail).

Then a delegation ascended the steps, knocked at the wicket and demanded that Casey be placed in their possession. After some delay the prisoner appeared and came down the stairs in irons. A burst of applause swept the crowd. One of the Vigilantes waved an uplifted hand and silence was immediately imposed. Casey entered a carriage and between a guard was drawn through silent streets to the Committee rooms. In his wake followed Charles Cora.

*The fifth day, Tuesday May twentieth,* the morning bulletin announced that King spent a restless night and did not sleep until dawn and awakened with nausea and vomiting, that his right pulse was rapid and weak, that his breathing was labored, that Doctors Toland, Hammond, Gray and Bertody had been with him since daylight.

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[9] The records of the war office at Washington show that John Strother Griffin, who was appointed Assistant Surgeon, June 18, 1840, served at Los Angeles, California, in 1847 and 1848. His resignation was accepted by the President, Sept. 14, 1854. He died Aug. 3, 1898 at Los Angeles, California.

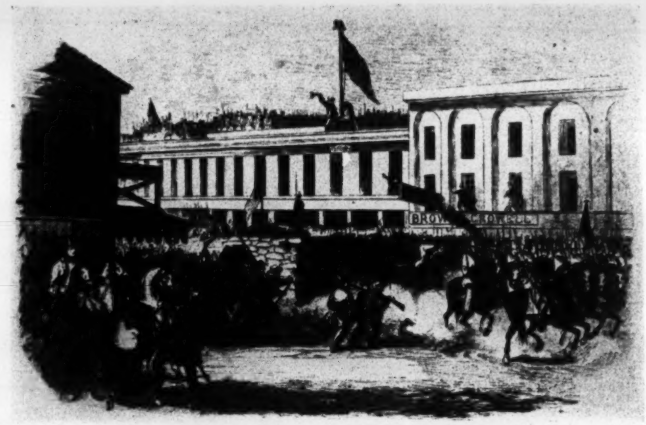

FIG. 12. SOUNDING THE ALARM BELL OVER FORT VIGILANCE, SAN FRANCISCO.

At about thirty minutes past one o'clock the bulletin boards made their last announcement, James King of William was dead.

The news went through the city like an electric shock. The streets were draped in mourning, sable emblems and crêpe were displayed on all the public buildings. Members of the Vigilance Committee appeared with a badge of crêpe on the left arm. The bell of the First Congregational Church, King's church, began to toll and continued throughout the day, several of the engine houses took up the solemn knell. Business was suspended, shops were closed, friends met but spoke little, the unemployed wandered about the city in silence. There was a breathlessness in the atmosphere such as that which forebodes some critical event.

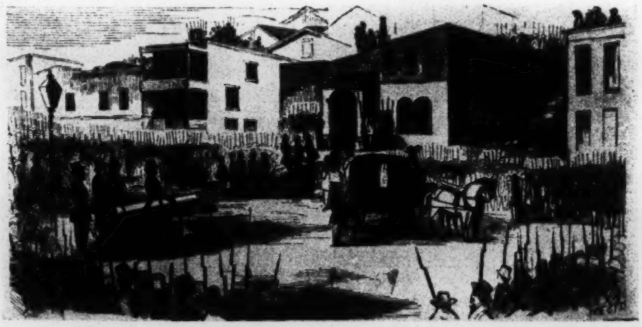

FIG. 13. SURRENDER OF JAMES P. CASEY AND CHARLES CORA, MAY 18, 1856.

After his death a post-mortem was performed. It was found that the subclavian artery was not injured; that the subclavian vein was severed and was the seat of considerable phlebitis; that the nerves of the brachial plexus were cut; that there was inflammation of the left pleura, caseous masses in the lungs and over a pint of bloody serum in the left chest.

Those who gathered at Fort Vigilance learned that Casey and Cora were on trial. When Casey was told that King was dead, a deadly pallor overspread his face and he trembled in every limb. To him that dread announcement was his own death-knell. He feared King dead more than he ever had living.

Two days later, Thursday May twenty-second, while all the bells in the city were tolling, James King of William in a hearse, drawn by four white horses draped in black and followed by a procession two miles long, was borne to Lone Mountain. Dr. Hammond and Dr. H. M. Gray preceded the hearse in a carriage.

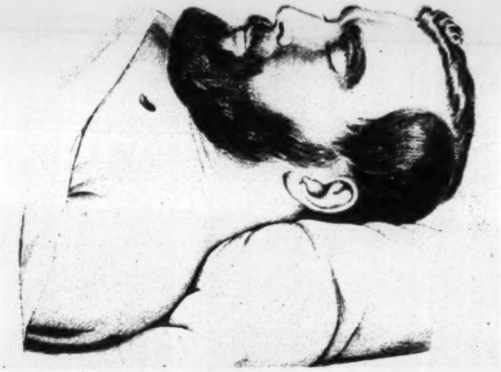

FIG. 14. JAMES KING OF WILLIAM AFTER DEATH.

At about the same hour quite a different scene was in progress at Fort Vigilance. Militia were drawn up on all sides. The trial was over. Casey and Cora were condemned to die upon the scaffold. The sentence unnerved Casey completely and he exclaimed, "Oh God! Has it come to this? Must I be hung like a dog?" But Cora was a gallant little villain and heaved not a sigh for life but one for love. One last look at Belle was all he asked for that would take the sting from death. Both being Catholics, they requested the presence of a priest. But when Father Alcoty arrived, he would not absolve Cora nor grant him the sacrament until he married his inamorata. A hurry call was therefore sent in her direction and she was whisked through a back door of the fort and while the bells tolled a requiem for King, she became Belle Cora in reality. Then with their shackles removed, their arms and legs pinioned and a rope around their necks the prisoners stepped upon the scaffold. The traps were sprung and they plunged into eternity.

Casey had a grand old-fashioned Irish funeral. After all, he had done something for his party even if he was hanged for it and his followers were not ungrateful; eighty-four carriages, eighty horsemen and four hundred on foot followed him to the Mission Dolores. Later his admirers reared a monument to his memory where the inscription may be read to this day "Vengeance is mine saith the Lord." Meanwhile Belle Cora took her husband's body from the grim executioners and bathed it in tears and placed it in a casket of solid mahogany lined with white satin and adorned with a silver plate. Then in one of the six hacks that held his gambler cronies, she followed him to the cemetery.

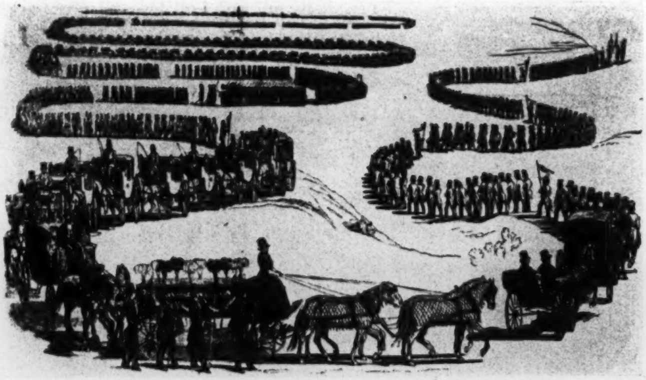

FIG. 15. FUNERAL PROCESSION OF JAMES KING OF WILLIAM.

No matter what he had been in life, in death James King of William became a popular idol, a martyr to the cause of justice. It was conceded that he had died that San Francisco might be regenerated. Most men achieve more in life than in death. For James King of William the reverse was the fact. He accomplished more dead than alive. To the community at large the announcement that he was a corpse was the signal for the success of all his hopes and plans. In one short moment of time, not only did he achieve eternity but he attained his ambitions and immortality. If life was a failure, death was a triumph.

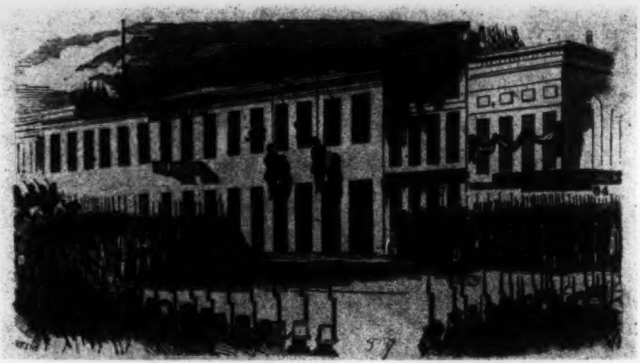

FIG. 16. EXECUTION OF JAMES P. CASEY AND CHARLES CORA.

In the revolution that followed two murderers, Hetherington and Brace, expiated their crimes and King's death on the gallows at Fort Vigilance. Yankee Sullivan, the pugilist, who helped Casey stuff some ballot boxes, was arrested and committed suicide at Fort Gunny Bags, rather than take a chance with the Vigilantes, and twenty-six notorious criminals were exiled. Thus did the Vigilance Committee clean up San Francisco and expiate the murder of James King. Ned McGowan, who plotted with Casey to murder King, fled the city and hid in Santa Barbara. Could the Vigilance Committee at this time have seized him he would have undoubtedly been hung. They even sent a posse to Santa Barbara to ferret him out but due to the offices of the bandit Powers and Dr. Den, he escaped.

*The question of the sponge*, however, was by no means relegated to the past. It bobbed up unexpectedly in February of 1857 during the second session of the State Medical Society at Sacramento. At the final meeting a motion was made and an unanimous vote passed that Dr. Cole report to the society "all the facts and points within his knowledge," pertaining to the case of James King of William.[10]

In this report, without mentioning any names, Cole reported that he was called to attend Mr. King when he was first shot, that the wound was a mere flesh one and was not at all dangerous and that with ordinary care and judgment there would not have been the slightest danger to the life of the wounded man. But the over-anxiety of Mr. King's friends was such that they called in other physicians and he withdrew from the case in disgust. He stated that a sponge was left in the wound five days and felt that was at least one of the causes of the death of the injured man. In addition there were several other contributory acts of an injurious nature performed by his physicians. In conclusion he did not hesitate to pronounce it a case of gross malpractice. It is hardly necessary to add that the remarks of Dr. Cole created quite an uproar among the medical gentlemen present and some time ensued before the excitement was allayed.

The *State Journal* at Sacramento got wind of Dr. Cole's report and their number of February fourteenth, 1857, appeared with these glaring headlines: "James Casey innocent of murder. Death of James King caused by doctors." The article went on to say that it had been previously understood that James King died on account of having been shot by one Casey: that the man who fired the fatal bullet was taken and hung without trial; that now, if the testimony of Dr. Cole could be taken as correct, it turned out that the deceased did not owe his death to Casey but to other parties; and that this showed the danger of hasty lynch-law hanging.

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[10] *Alta California*, March 14, 1857.

Another paper quoted Cole as saying that King was consigned to the care of ignorant and unprofessional practitioners and that if they had exercised ordinary skill and prudence he would have recovered from his injuries.

Immediately upon Cole's return to San Francisco, from the convention, he received the following note:[11]

San Francisco, California, March 2d, 1857.

To Dr. R. Beverly Cole, Sir: We understand that you related a history of the injury and last illness of the late Jas. King of Wm. before the State Medical Convention of California, at its last session, together with comments upon the treatment instituted in his case. Will you be kind enough to inform us upon what data, and from whence derived, you founded your knowledge of the case?

Respectfully,
Dr. Hammond,
Dr. Bertody,
Dr. Toland,
Dr. Gray.

To this he replied:

San Francisco, March 4, 1857.

Gentlemen: Yours of yesterday was received, and in reply I have only to say, that the information upon which was based the history of Mr. King's case, as given by me, without comment, before the State Medical Society, at their last meeting, in Sacramento, was acquired through personal observation and reliable sources.

Respectfully,
Beverly Cole, M.D.

To this reply through the columns of the *Alta California* Dr. Toland and Drs. Hammond, Bertody and Gray issued a statement to the effect that Cole had had no opportunities to make "personal observations," that during the first night after Mr. King's injury at his own request, he with others remained in the room as a watcher and on one other occasion, when his presence in the sick room was inexplicable to the attending physicians as it was by them unexpected and undesired; that Cole was never for a single moment in charge of the patient, either as attendant or consultant, nor could he, by any possibility be admitted to the consultation, for the reason that in consequence of some previous conduct, not one of the physicians in attendance on Mr. King would have consented to hold professional intercourse with him; that he was present at no examination of the wound nor did he attend the autopsy; that he tried to gain admittance there but was prevented by an officer of the law.

As to his "reliable sources" of information regarding the treatment and condition of the patient, they said that none of the attending physicians had directly or indirectly given such to R. Beverly Cole and that none worthy of confidence could emanate from others.

To this statement Cole replied, likewise through the press, that they were mistaken as to the fact that he was not present at any of the examinations of the wound, that he was present at the first one and helped to dress it. As for the subsequent ones he wrote, "*I should regret to acknowledge any participation in them.*"

Shortly after this, at Sacramento, Ned McGowan surrendered himself to the authorities and appealed to the legislature to pass a specific law to enable him to secure a change of venue so that he might be tried elsewhere as it was still unsafe for him to present himself in San Francisco. This was granted and a law passed and his trial for conspiracy as an accessory to the murder of James King of William was therefore held at Napa, in May 1857 with Judge E. W. McKinstry on the bench. On account of their newspaper discussions regarding the sponge and its influence on the death of James King, both Cole and Toland were subpenaed as witnesses, Cole for the defense and Toland for the prosecution.

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[11] *Alta California*, March 5, 1857.

The trial caused great excitement. The sponge played a prominent rôle in the testimony. Three questions, presented by the facts, engaged the attorneys on both sides. The first was: Did King die of the wound inflicted by Casey or as the result of malpractice on the part of attending physicians? The second was: If King died from the wound was that act murder, manslaughter or justifiable homicide? Third and chiefly: What was the complicity of the accused with that act?

Cole in his testimony claimed that the presence of the sponge and the pressure of the tourniquet induced the fatal phlebitis and caused King's death and he brought into court a prepared body said to have been Nicholas Graham executed at the county jail a year previous, to prove his point. The stench was at times intolerable but by his specimen Cole showed the route pursued by the bullet and the place occupied by the sponge and its effect on the veins etc. Once during the course of the trial he was asked by the defense: "Are you of the opinion that Mr. King died from the effect of the wound, or from the active treatment pursued toward him by the physicians who were in attendance upon him?"

Question objected to.

Overruled.

Cole answered as follows:

"The question covers two points. I will answer them separately. In my opinion the wound was not necessarily a mortal one; and next, the treatment was such as to make it a mortal one, or in other words to cause death." Again he was questioned regarding Dr. Toland's reputation and replied:

> Among the community it was quite different from what it was among the profession. I have formed my opinion from seeing a large concourse of people going into his office and judge that his practice is not among the most intelligent and respectable persons in San Francisco. But I do not wish to raise this question and am willing to admit that he is a respectable practitioner.

Questioned regarding Drs. Hammond, Bertody and Gray, Cole replied, "They have the reputation of being careful practitioners, but it often happens that fatal errors are made by careful men." Questioned as to his object in making these derogatory remarks, he admitted that he had lectured on the case and expressed views different from the other practitioners because he had a desire to see right and justice done. As for his reasons for withdrawing from the case, he stated that he did so voluntarily from a want of that courtesy which it is customary for one medical gentleman to show another.[12]

When Dr. Toland was called to the stand he confined his evidence strictly to the case in hand and made no personal remarks against Cole. He claimed he left the sponge in the wound because there was no left pulse and he feared the subclavian artery was severed or injured and would rupture or slough; that the wound caused a lesion of the vein and injury of the nerves in the vicinity; that as a consequence, inflammation of the chest and inflammation of the vein followed and death ensued.

The testimony concluded, Judge E. W. McKinstry, on the bench, made a lengthy charge to the jury. It occupied twenty minutes in its delivery. During this time he admonished them in part as follows:

> If you are satisfied that James King met his death under such circumstances as constituted the crime of murder, and that the defendant, McGowan, assisted in or counselled the act, then you are bound to find him guilty. If,

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[12] *Daily Evening Bulletin*, June 2nd, 1857.

> however, you find that the crime was that of manslaughter, that crime implies no malice, but a sudden killing in the heat of passion, and there can be no accessory; therefore you would have to acquit the defendant. From the testimony offered by the two physicians, you have to determine whether Mr. King died from the effect of the wound itself, or as the result of malpractice. If from the wound, then the death was the result of the act itself. But if as the result of the mode of treatment,pursued by the physicians, then you have no further examination to make and must acquit the defendant. If a person receive a wound, not in itself mortal, which superinduces a disease afterwards, causing death, this is murder; but if the treatment produce a new disease, which proves fatal, then the party inflicting the wound is not guilty of murder. I understand Dr. Toland to say that the wound caused lesion of the vein and injury of the nerves in its vicinity, and, as another consequence, inflammation of the lining of the chest, which, with an inflammation of the vein itself, caused death. Doctor Cole says the wound itself was not mortal but that death was caused by the use of the sponge and tourniquet, which, in his opinion caused the fatal disease of phlebitis or inflammation of the vein.
>
> The question thus stands, and is one of fact for you to determine. Pay therefore, due attention to the statements of the physicians and draw your own conclusions.
>
> . . . If, after a fair examination of all the facts and testimony, you still have a reasonable doubt as to the guilt of the prisoner, you must acquit . . . If the jury are of the opinion that Casey committed a murder and are not satisfied that the defendant aided and abetted the crime, they must acquit him. With these remarks, gentlemen of the jury, I leave the case in your hands.

The jury considered the testimony for ten minutes and then brought in a verdict of "not guilty;" that sponge or no sponge James King of William had died as a result of a bullet wound inflicted by one James Casey, and Ned McGowan was discharged.

The press paid little attention to the sponge or the verdict. It was the opinion of the *San Francisco Herald*, March ninth, 1857, that James King of William, who was neither afraid of bullets or assassins, was frightened to death by his doctors. The editor described the conditions about him as follows:

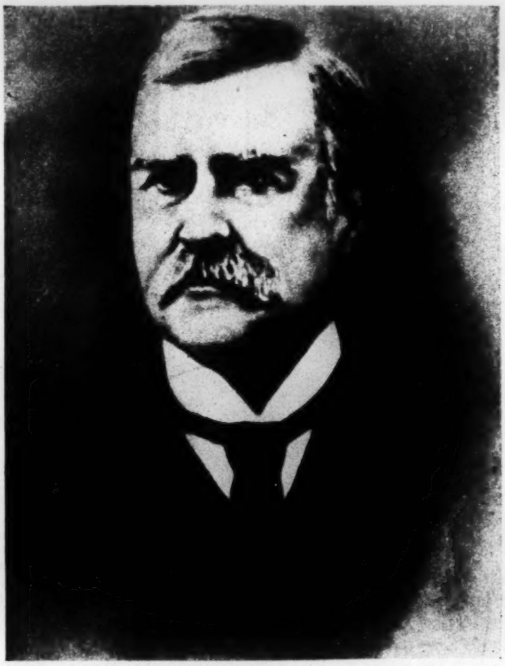

FIG. 17. JUDGE E. W. MCKINSTRY. COURTESY, CALIFORNIA PIONEERS.)

> Instead of being under the care of one good and capable physician, the wounded man was surrounded by a legion of the "faculty" each one with long drawn face, solemn look and anxious mien; that there was the ominous shaking of professional heads, the whispered consultations, the *pharisaical* use of medical terms, unintelligible to the professional ear, the positive assurance of some that the subclavian was injured, the opposite opinion of others to the contrary, and the natural doubt of both parties; the impressive feeling of the pulse by one after the other, to determine the fact of the escape of arterial blood; the nods from one to another; the variety of treatments ordered, countermanded and modified; the lugubrious tones of the attendants; the tramp of armed men in the streets; the intense excitement of the times and numberless solicitations of individuals to see the wounded man. Nearly every time his door opened a professional face was certain to present itself and almost every hour

of the day and night the patient had to endure such annoyances, under the plea of deep interest and disinterested friendship. His very watchers were doctors. His room was more like a medical college than a sick mans' apartment. In our opinion it was to these causes destroying the nervous system of the patient, inducing mental and physical excitement, superinducing inflammation and consequent mortification and death, that the decease of Mr. King is attributable.

In another paper appeared this poem:

WHO KILLED COCK ROBIN?

Who killed Cock Robin?
  I, says Dr. "Hammon"
With my chloroform and gammon
  I killed Cock Robin.

Why was it given
  In a smothering dose, by heaven?
I refuse to say
  Replied Dr. Gray.

Who put in the sponge?
  I, says Dr. "Lunge,"
They did me impunge
  So, "Bedad," I left in my sponge.

Who found the sponge in the body?
  I, says [clever] little Bertody,
I found it in the body.

Who took it out?
  I, says plucky Stout,
I took it out.

Who blabbed the whole
  I, says Dr. Cole,
It lay on my soul
  And I blabbed the whole.

In conclusion perhaps it is not amiss to entertain the possibilities whose methods of treatment were correct, R. Beverly Cole's or H. H. Toland's and his adherents? Had Dr. Cole's method of treatment been followed and no sponge been inserted in King's wound, what would have been his chances for recovery? Had King recovered what would have been the effect on the history of the period and the Vigilantes in particular?

What would have been the fate of Casey and Cora, of Hetherington, Brace and Yankee Sullivan to say nothing of the twenty-six men exiled forever from California? Did their fate, as well as King's, depend upon the sponge? If you admit that nature rights all flagrant wrongs was King her instrument?

However you look at it, from the side of Dr. R. Beverly Cole or through the eyes of Dr. H. H. Toland and the other eminent surgeons involved, James King of William did not die in vain. His destruction resulted in a reconstruction of law and justice, truth and honesty in San Francisco. He died that others might live in security and safety; and as the Book of Books says of such a one, "greater love hath no man than this."

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# NATHANIEL CHAPMAN AND HIS LECTURES ON THE PRACTICE OF PHYSIC, PHILADELPHIA, 1818

*By* DAVID L. FARLEY, M.D.

PHILADELPHIA

SOME time before the American Revolution a young English woman, a first cousin of the Lord Cornwallis who later surrendered a British army to George Washington at Yorktown, went with her husband to Virginia to live. Her daughter, Sara Smith, became the wife of Colonel John Blair, an officer of the American Revolutionary Army. A son, John, attended the Medical School of the University of Pennsylvania in Philadelphia.

The inspiration of this article is a manuscript, bound in dark leather and possessing an odor of age and respectability. It is the medical notebook of John Blair. On the title page is found: "Notes from Dr. Chapman's Lectures on the Practice of Physic, Philadelphia, 1818, *Multos Morbos Multa Fercula Fecerum*." It contains 338 pages written in a neat and legible hand. John Blair died of pneumonia at the end of his second year in Philadelphia His notes were used as a practical reference for many years by his half brother, Dr. Pharoah Boone Cobb.

Nathaniel Chapman is a minor figure in universal medical history. He made no great discoveries in medicine, yet for fifty years he instructed students in one of the leading medical schools of America. Through his students he exercised a far-reaching influence on American medical practice.

As one reads the notes from Chapman's lectures, the self-assurance of the speaker, when treatment is discussed, is impressive. In those days the physician grappled valiantly with the Grim Reaper and overcame. No inferiority complex tied his hands. His remedies did not simply assist the patient's natural tendency to recover. He bled and puked and purged with facility and faith. The impression he made was greater than that of the disease, and by that mysterious virtue of sympathy possessed by all living things he prevailed. Here was a noble basis for personal dignity and self-satisfaction. The gold-headed cane, the high silk hat and the obsequious colored boy, fittingly filled the picture.

## PERSONAL DATA

Nathaniel Chapman was born in Fairfax County, Virginia, on the 28th of May, 1778. The American Revolution was in progress. His father, George Chapman, was a well-to-do merchant. After elementary study in the common schools in the neighborhood of Summer Hill, Virginia, he attended the Classical Academy at Alexandria. He then attended for a short time two colleges. His medical education was begun in the office of Dr. John Weems, a relation in Georgetown, D. C. Here he remained a year. Then for a time he studied medicine with Dr. Dick of Alexandria, Virginia. In 1797 he went to Philadelphia and began a course in medicine at the University of Pennsylvania. He became a favorite of the signer of the Declaration of Independence, the powerful and opinionated Dr. Rush. This connection and his later marriage determined his career.

After graduation in 1800 from the University of Pennsylvania, he engaged in medical studies for three years in Europe. His first year was spent in London under Abernethy, his second two years at Edinburgh. In 1804 he began his teaching career with private quizzes and lectures in obstetrics at the University of Pennsylvania. James was the professor of obstetrics. Other members of the faculty were Rush, Barton, Wistar and Shippen.

In 1813 he was elected to the chair of

materia medica. He held this chair for two years. In 1816, on the death of Barton, he was elected to the chair of the theory and practice of medicine and clinical medicine. He was thirty-eight years of age and had been in medical practice thirteen years. In 1808 he had married Rebecca Biddle. In 1820, he founded the *Philadelphia Journal of the Medical and Physical Sciences* afterwards called *The American Journal of the Medical Sciences*. This is one of the greatest American medical journals of today. He held the chair of medicine until 1850. He was emeritus professor for three years and died of "gradual decay," in 1853, at the age of seventy-five years.

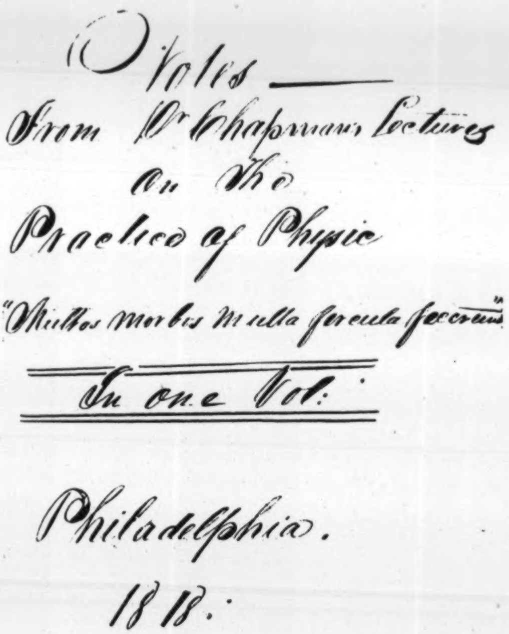
### BASIC MEDICAL PHILOSOPHY OF CHAPMAN

From the period of the first records of medical practice in Egypt and Greece until about the middle of the 19th century it was the custom in medicine to attempt to explain disease on the basis of one philosophical system. Remedies and cures for disease were based upon this guiding principle or philosophy. Physiology or normal functioning of the body was necessarily explained by the same theory. The humoral theory, for instance, defined health or normal physiology as a state where proper balance between the four humors, the blood, the bile, the black bile, and the lymph, was in force. Disease was due to a lack of such balance, an undue or abnormal predominance of one humor over the others. Treatment followed. The excessive humor must be eliminated by purgation, sweating, bleeding or some other means. Medical theory, like religion, was usually a matter not of proof but opinion.

During Chapman's time, medicine made great strides towards the subordination of theory to facts. Shortly after the death of Chapman, the two fundamental facts of modern medicine began to be established. These were the discovery of the cellular composition of the body tissues and the discovery of bacteria and living organisms as the cause of disease.

Of the *modus operandi* of medicines Chapman says:

> The operation of medicines does not depend on any of the common laws of matter but on a principle incident to vitality alone. *Medicamenta non agunt in cadaver.* Of the various doctrines of vitality, one only appears to me to be at all well-founded. It presumes that every animated body, animal or vegetable, is endowed with a primordial principle of life . . . which constitutes the power by which . . . the animal economy is defended against the action of mechanical or chemical laws.



Notes —
From Dr Chapman's Lectures
on the
Practice of Physic

"Multos morbos multa fercula fecerunt"

In one Vol.

Philadelphia.

1818.

FIG. 1. TITLE PAGE OF JOHN BLAIR'S MANUSCRIPT NOTES FROM CHAPMAN'S LECTURES.

Chapman's central idea, which controlled his judgment in the giving of medicines, was the profound influence of the stomach upon the rest of the body. The manner of this action was through sympathy. Sympathy was more than a mere nervous connection. He says:

> Conveniently situated for the purpose, the stomach is probably the throne of the vital principle from which would seem to emanate an influence that, diffused over the system, preserves the order of the parts, and sustains the vigor, tone and well-being of the whole

animal economy. *Languido ventriculo, omnia languent.* Assailed, however, by impressions which it cannot resist, this organ as the center of association becomes the seat of the first link in the chain of most diseases, and is always the chief medium of the operation of our remedies, in the correction of morbid derangements.

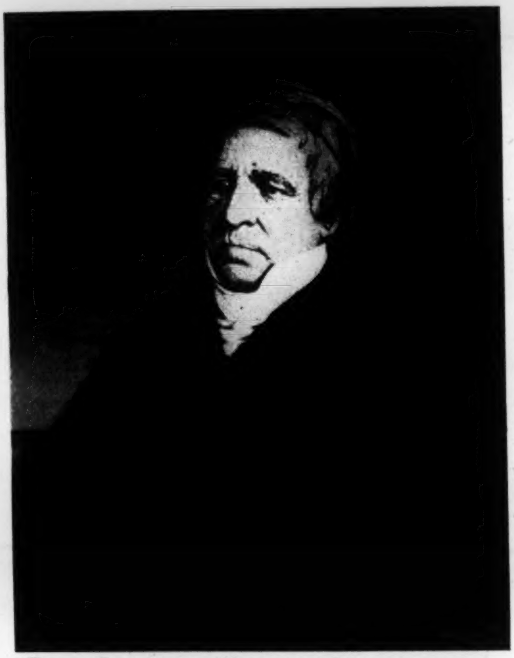


Fig. 2. Portrait of Nathaniel Chapman, from the Original in the Possession of the College of Physicians of Philadelphia.

He objected strenuously to the theory that remedies were absorbed into the blood and thus exerted their action. This idea he considered a remnant of the exploded humoral theory. He proved to his own satisfaction that a medicine introduced into the stomach was not absorbed as such but was broken up by the stomach into its own special products without action after entering the blood or lymph. The action of the medicine was due entirely to the impression it made upon the stomach with transmission of the impression by sympathy. Being confronted with the fact that a drug such as mercury could be introduced into the stomach and could be found later in the saliva and urine, he conceived the drug as being split into harmless products by the stomach which were later resynthesized and built up, after excretion in the urine and saliva. Peruvian bark cured malaria by the sharp and peculiar blow it dealt the stomach. Much of Chapman's practical treatment can be explained by referring to the Aphorisms of Hippocrates:

1. All diseases go off, either by the mouth, or by the stool, or by urine, or by some other way, as the joints for instance, or by sweat, which is common to all.
2. Acute cases go off, either by bleeding at the nose, at the time of crisis, or by profuse sweats, or by purulent and mucilaginous urine, in great plenty and with good sediment, or by a considerable abscess, or by mucous and bloody stools coming away on a sudden, or by well-conditioned vomitings about the same time.
3. Redness of the face in a fever with a violent pain in the head and beating of the vessels, generally denotes hemorrhages (venesection); nausea, heart burnings, and spittings, denote vomiting; belching, flatus and rumbling in the belly denote purging.

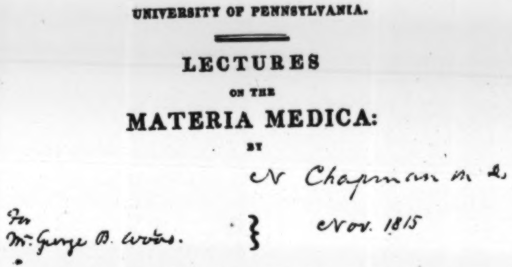
The views and opinions of Chapman as set forth in his writings and lectures reflect the standard American medical thought of the times. The face of America was turned toward Europe. The celebrated Dr. Cullen of Edinburgh was the outstanding clinical figure. Cullen's "Practice of Physic" went through a surprising number of editions and appears to have been extensively used as a textbook in America long after Cullen's death. In his lectures Chapman advised his students to read Cullen's book.

## Analysis of Points of Interest in the Notes from Chapman's Lectures

Nathaniel Chapman was a conservative. There is a fashion in medicine as in every other thing, he warns the student. The new test of boiling the urine to determine the nature of dropsy by the presence or absence of coagulable albumen is to be received cautiously, although the new theory is sufficiently plausible to awaken inquiry. The theory of the unity of disease he rejects. This remarkable idea was taught by his benefactor, Dr. Rush. According to Rush, the cause and essential character of disease was always the same. The differences in symptoms and signs were due to the variable reaction of the individual patient.

ETIOLOGY OF DISEASES. Chapman was convinced that intermittent fever (malaria) was caused by marsh exhalations and that it was carried 8 or 10 miles by the wind. The cause of typhus fever was located in the stomach, hence, an emetic timely given would frequently arrest the disease. He could not agree with Dr. Rush that yellow fever was aggravated autumnal fever and that the liver was the seat and throne of the disease, but was convinced that Dr. Physick had proved that the cause was located in the stomach, hence the black vomit. In hectic fever Chapman conceived the miasmata to be entangled in the saliva. When this was swallowed a first impression was made upon the stomach, whence by sympathy it was communicated to the general system. Fever in general was a disease caused by local irritation, usually located in the stomach. Hemorrhage might be caused by anything which accelerated the blood, as unsatisfied venereal desire. One very common cause of hematemesis was the eating of ice cream. The cause of dyspepsia above all was habitually cold feet. He once knew a case of iliac passion brought on by eating cabbage in which half a pot full of feces was discharged by mouth. Hemorrhages from the lungs, he had seen more than once end in consumption. Tuberculosis was dependent upon a deposition of erratic matter from the extreme vessels. Scientific men in every age have taken refuge in words. We are forced to conclude that Chapman's ideas on the cause of disease were as obscure as the nature of the seven devils that passed into the swine on the shores of Galilee.

BLOODLETTING. The absolute conviction of Chapman of the efficacy of venesection in the cure of disease is a feature of his notes. His voice rings with authority when bloodletting is considered. In 1922 Peterson and Levinson summarized the physiological changes obtained by bleeding as increase in leucocytes, increase in nitrogen excretion, marked increase of cholesterol, lecithin and fats, mobilization of fibrinogen from the liver, alteration of the sedimentation time of the corpuscles, mobilization of antibodies, production of a hyperglycemia, flooding out of residual tissue nitrogen into the blood stream, the obtaining of a reaction similar to non-specific protein therapy, a diminution of alkali reserve, and a change in the ferment—antiferment balance of the blood. Chapman bled almost every patient he attended. He is so certain that he cured many desperate cases by venesection that one reading the notes almost believes. In any event the conclusions of Peterson and Levinson with those of Chapman makes one wonder whether a valuable method of treatment is being today too little used.



UNIVERSITY OF PENNSYLVANIA.

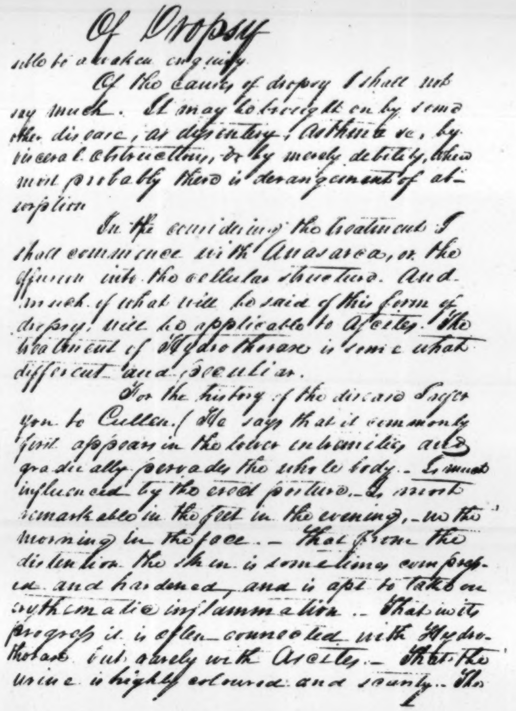
LECTURES
ON THE
MATERIA MEDICA:
BY
N Chapman M. D.

For
Mr. George B. Wood. } Nov. 1815

FIG 3. CARD NECESSARY FOR ADMISSION TO DR. CHAPMAN'S LECTURES. THE ORIGINAL WAS USED BY DR. GEORGE B. WOOD, CHAPMAN'S SUCCESSOR TO THE CHAIR OF THE PRACTICE OF MEDICINE AT THE UNIVERSITY OF PENNSYLVANIA. COURTESY OF DR. FRANCIS R. PACKARD, PHILADELPHIA.

In malaria Peruvian bark was always preceded by bleeding. It was thought dangerous to give it without this preparation. Bloodletting was also of great importance in typhus fever. In yellow fever when called early, the first object was to subdue inflammation by the use of the lancet. He states that Dr. Jackson was in the habit of taking sixty ounces, regardless of syncope, at one bleeding and that when the patient recovered from this no trace of the disease was left. The lancet was the most efficacious remedy known for yellow fever. In hectic fever bloodletting was a proper remedy.

Hemorrhage from the lungs was treated by venesection. Hemorrhage from the stomach, likewise, was an indication for bloodletting. Chapman seemed to include appendicitis and peritonitis under the heading of gastritis. He states that pallor, wild eye, distended abdomen and quick pulse, and occasionally aversion to water, precede gangrene in this disease. He advises the doctor to bleed twenty to thirty ounces, regardless of weak pulse and prostration. As blood was extracted the pulse would expand itself. Disregard the weak pulse and bleed as often as necessary. In the course of one day he had withdrawn as much as seventy ounces. In a case in Philadelphia, after one hundred and twenty to one hundred and thirty ounces of blood had been lost, the most prompt relief was obtained by sweating. One should remember that one hundred and thirty ounces is four quarts. Both ordinary colic and lead colic were treated first by bleeding. After the patient suffering from lead colic had been bled, he was then salivated with mercury.



Of Dropsy

ible to awaken enquiry

Of the causes of dropsy I shall not say much. It may be brought on by some other disease, as dysentery, Asthma &c, by visceral obstructions, or by merely debility, then most probably there is derangement of absorption

In the considering the treatment I shall commence with Anasarca, or the effusion into the cellular structure. And much of what will be said of this form of dropsy, will be applicable to Ascites. The treatment of Hydrothorax is some what different and peculiar.

For the history of the disease I refer you to Cullen. (He says that it commonly first appears in the lower extremities and gradually pervades the whole body. — Is much influenced by the erect posture. — Is most remarkable in the feet in the evening, — in the morning in the face. — That from the distention the skin is sometimes compressed and hardened, and is apt to take on erythematic inflammation. — That in its progress it is often connected with Hydrothorax but rarely with Ascites. — That the urine is highly coloured and scanty. — The

Fig. 4. Page of the Manuscript Dealing with Dropsy.

Chapman taught that venesection was the most efficacious remedy for cholera morbus. In cholera infantum, which he states was confined to infants under two years of age, the lancet was particularly indicated. Consulted in the ordinary case of dysentery he says one ought to precede everything else by venesection. In diarrhea circumstances may point out the utility of bloodletting. In some cases he had bled twenty times. Even the patient with an ordinary acute cold was bled. In some instances, he withdrew a hundred ounces, (three quarts) before the subjugation of this disease. In pneumonia, the patient was suffocating. He advises that the orifice should never be closed until relief was obtained. "It is better to bleed him to death than suffer him to die of the disease." In whooping-cough, one could hardly doubt the propriety of bleeding. Gout, rheumatism and dropsy were markedly benefited by venesection.

Treatment was active and persistent. The patient could not be blamed for preferring his disease to the remedies. For instance, in intermittent fever in addition to Peruvian bark, he says:

> We commonly begin with venesection . . . next we give an emetic . . . then you resort to purges, and mercurials are the best . . . after this you may give some mild diaphoretic . . . If the disease does not yield in two or three days recur again to the use of your medicine and apply blisters . . . when they can be had leeches are to be applied.

If there was loss of susceptibility of the stomach to remedies they were directed to the rectum. This was called the *ultimum moiens*.

The treatment pursued by physicians of this period in some ways reminds one of the story of the Japanese prince, a most estimable young man of thirty-one, courteous, well poised, possessed of a clever wit, a friend of learning and of art and a devout Christian, according to the Jesuit Journal, but possessing one peculiar trait. This trait was a profound joy in the killing of men. He had a room in his palace fitted up with the necessary tables, blocks and instruments and when a man in his kingdom was condemned, he chose to execute him himself. This he did in various ways, sometimes neatly chopping him down limb by limb, again slitting up his chest to observe the beating of his heart.

**Miscellaneous Points of Interest.** Dried spider and spider's web was used as a hypnotic. The ordinary black spider was considered best. Despite the bizarre nature of this remedy, it occurs to the author that the spider may secrete an alkaloidal poison which, smeared on its web, is useful to it in the securing its prey, an anesthetic to an insect entangled in its web. Chapman was quite sure that spider's web in a dose of two grains exerted an action like that of opium.

Chapman states that he has seen a dram of calomel given at a dose. Our dosage of two grains seems puerile beside such robust dispensing. A blister to the whole head was applied in delirium. One wonders how such a blister would appear. Emetics were given "to break the morbid association of irritation." This is truly occult terminology. Dr. Physick originated a tube to evacuate the stomach when poisons had been swallowed. Since rubber was not in use at the time, we are curious concerning the material from which it was made. Chapman does not tell us.

We find the germ of the modern idea of non-specific therapy. He notes that asthma is often cured or benefited by malaria, that tuberculous subjects were benefited by malaria and those living in miasmatic districts were unusually free of tuberculosis. He thinks that intermittent fevers sometimes cure other diseases as gout, rheumatism, acute and chronic, chronic cutaneous eruptions, chorea, epilepsy, asthma, hysteria, mania and especially melancholia.

A tobacco enema was useful in some forms of diarrhea. Mercury according to Chapman could produce all the manifestations of syphilis. This he called the mercurial disease. He discourses somewhat heatedly on the vulgar notion that syphilis required a prolonged course of mercury and assures his students that it can be cured by keeping up a gentle salivation for a few weeks. Cold water was beneficial in plague. This he verifies by an anecdote to the effect that Napoleon's army in Egypt while suffering severely with plague were ordered on a forced march. Being caught in a violent rain storm there was an immediate and almost miraculous improvement in the health of the plague-stricken soldiers. Exercise was considered good in dropsy. This is illustrated by a story of remarkable recovery from dropsy in a patient who walked from Virginia to Philadelphia to consult Dr. Rush. When he arrived his dropsy had disappeared. It was evidently not of cardiac origin.

One hundred years from now, in the light of the advancement in the medical sciences during the preceding century, some of our theories and practices will, in all probability, be considered as bizarre as Chapman's are today. I know of no better way of ending this discourse than to paraphrase the perennial axiom of Hippocrates, "Time is long, art is fleeting, experience is fallacious and judgment difficult."

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# ALBIGENCE WALDO, SURGEON

## HIS DIARY WRITTEN AT VALLEY FORGE.

*By* HERBERT THOMS, M.D.

NEW HAVEN, CONN.

WHEN the news of Lexington and Concord reached the town of Pomfret, Connecticut, and the redoubtable Putnam made his historic ride, among the neighbors shortly to follow him was a young doctor named Albigence Waldo. He also joined the Continental troops at Cambridge, and from that time until near the end of the Revolutionary struggle, in spite of frequent ill health, gave unstintingly of his services.

Dr. Albigence Waldo is of interest as a surgeon and patriot of the Revolutionary period, and of especial historical value is his record as an army surgeon during his service at the memorable Valley Forge. This has fortunately been preserved for us in the form of a diary, the greater part of which is here reproduced.

This Connecticut doctor was born in Pomfret, February twenty-seventh, 1750, the son of Zachariah and Abigail [Griffin] Waldo. His early education was obtained in his native town and he was instructed in Latin and the higher English branches by the parish minister, Rev. Aaron Putnam. His medical studies were carried on under the guidance of Dr. John Spaulding in the neighboring town, Canterbury. After this apprenticeship, he settled in Pomfret, taking the place of Dr. John Hall, who had moved to Vermont. On November eleventh, 1772, the young doctor married Lydia Hurlburt, and if we judge from his letters and other writings, we may be certain that the match was a happy one. Four sons and three daughters were born to them.

Even before the outbreak of the Revolution, Dr. Waldo was interested in military affairs, and was "clerk" to a troop of horse under the command of Captain McClellan, who later became General. This was the body of soldiers that marched to Cambridge soon after the "shot heard 'round the world," where they remained eight days and then returned.

On the first of July, 1775, at a special session of the General Assembly of Connecticut, he was appointed Surgeon's mate of the eighth regiment commanded by Colonel Jedediah Huntington. Dr. Waldo was not a robust soldier, for we find frequent allusions to ill health throughout his writings. He was unwell shortly after his appointment, according to a letter written by his Colonel to that officer's brother, Jabez Huntington, and dated Roxbury Camp 21, August, 1775. He writes:

> The season as it is called of my Regiment is coming on fast. The Hospitals provided at Continental Expense are full of Persons and Distemper, I make other provision the best I can for my sick doubt not what I & the Doctors lay out for Bedding and Necessaries for them will be refunded. I have only Doctor Turner to administer at present as both his Mates are sick but getting better.

Three weeks later, in a letter of Colonel Huntington to Governor Trumbull, dated at Roxbury, September sixth, 1775, we learn that "Dr. Waldo, of Pomfret, is discharged and gone home, on account of his ill state of health." He could not have remained at home very long, because, in a communication Dr. Waldo says:

> In the autumn of 1775, he went to Bergen, Ft. Lee, etc., surgeon of the 11th Regiment of Militia of Connecticut, and returned home with the Regiment, who were uncommon sickly, and required unusual exertions.

In the Acts of the General Assembly, in session December fourteenth, 1776, Dr. Waldo's name again appears and we find that he was appointed Chief Surgeon of the ship, Oliver Cromwell. This ship was built at Essex, then part of Saybrook, and was the first full-rigged ship constructed under the general direction of the Governor and Council of Safety. Dr. Waldo was not destined, however, to serve as a navy surgeon, for Middlebrook tells us that after the launching, difficulties with the crew caused delay and trouble, due to lack of pay and provisions, and that some officers retired. Dr. Waldo himself states that he was induced to leave the ship by an invitation from Colonel Huntington to join his newly raised regiment, this time as surgeon. He obtained the Governor's permission for this exchange, and joined the regiment early in 1777, in New Jersey.

In the Acts of the General Assembly, we find that this appointment is dated April third, 1777, where we read "Albigence Waldo was appointed surgeon in Col. J. Huntington's regiment." This was a place made vacant by Dr. Philip Turner, of Norwich, who had been promoted to the directorship of the Hospital and Store, of the State of Connecticut.

The diary was written at Valley Forge, where early in December, Washington had established his winter quarters. Here, at a point 20 miles from Philadelphia, 11,000 soldiers spent the winter, living for the most part in log huts. The Connecticut troops shared the hardships of that memorable winter. At one time the destitution was so great that nearly 3,000 men were reported as unfit for duty. Before the huts could be erected, tents were used as shelter, with the result that in some instances soldiers were actually frozen to death. Dr. Waldo himself was housed in a tent, and in one place states that "at this time from mere cold . . . contracted a numbness of the left hip, side and thigh, which complaint continued several years after."

The diary depicts a picture of Valley Forge which only such a record can, and is here for the most part produced:

Nov. 15th 1777. An attack was made on Fort Mifflin by 4 ships, 4 Batteries, & 1 Gally. Our People Fired from Fort Mifflin 1 Battery, 12 Gallies & two Shearbacks or small ships. The firing was incessant all Day. Our People defended themselves with unparallell'd bravery amidst a continual storm of Balls 'till at length when Capt. Lee's company of Artillery were almost cut off, and a reinforcement had stood at the Guns till 9 o'clock in the evening the Garrison evacuated the fort, after having spiked up the Cannon. Capt. Stephen Brown, was kill'd by a shot from the round-top of a Ship that had haul'd up in pistol shot of the Fort.

Mem. . . . Fort Mifflin was a Burlesque upon the art of Fortification. 26th Nov. . . . Lay in the Forest of Haddenfield, cold and uncomfortable. 2 Hessian deserters came in who declar'd our little parties had kill'd a number of the Enemy, 13 Prisioners were bro't in . . . 2 women. Nov. 29th . . . Storm increas'd. About one P.M. An alarm was made by a report that the enemy were within 15 minutes march of the Town to take the Baggage. Those of us who had horses rode up to Burdentown. The Baggage and the sick were hurried out of Town the same way, but had not got 2 miles before they were turn'd back on its being a False Alarm. For the sake of good living however, Dr. L. E. Parson & myself went to Burdentown up the River . . . Liv'd well & cross'd over to Winsor next Day and arriv'd at Bristol in the Evening when I had my Shoes and Silver Buckles stole . . . Dr. L. had a valuable Great Coat stole the Day before at Burlington.

Dec. 9th.

We came from within the breastworks, Where we had been coop'd up four tedious Days . . . with Cloaths and Boots on Night and Day, and resumed our old Hutts East of the Breastwork. The rest of the Army Chiefly had their huts within the Lines. We are insensible what we are capable of enduring till we are put to the test . . .

Dec. 11th . . . I am prodigious Sick & cannot get anything comfortable what in the name of Providence can I do with a fit of Sickness in this place where nothing appears pleasing to the Sicken'd Eye & nauseating Stomach. I doubt not Providence will find a way for my relief . . . But I cannot eat Beef if I starve for my stomach positively refuses such Company, & how can I help that?

Dec. 12th . . . Sun Set. We are order'd to march over the river . . . It snows. I'm sick. eat nothing No Whiskey. No Baggage-Lord-Lord-Lord. The Army were till SunRise crossing the River, some at the Waggon Bridge, & some at the Raft Bridge below. Cold & Uncomfortable.

Dec. 13th. The Army march'd three miles from the West side the River and encamped near a place call'd the Gulph and not an improper name either For this Gulph seems well adapted by its situation to keep us from the pleasure & enjoyments of this World, or being conversant with any body in it. It is an excellent place to raise the Ideas of a Philosopher beyond the glutted thoughts and Reflexions of an Epicurian. His Reflexions will be as different from the Common Reflexions of Mankind as if he were unconnected with the world, and only conversant with material beings. It cannot be that our Superiors are about to hold consultation with Spirits infinitely beneath their Order by bringing us into these utmost regions of the Terraqueous Sphere. No . . . it is, upon consideration, for many good purposes since we are to Winter here . . . 1st There is plenty of Wood & Water. 2dly There are but few families for the soldiery to Steal from tho' far be it from a Soldier to Steal . . . 3rdly There are warm sides of Hills to erect huts on. 4ly They will be heavenly Minded like Jonah when in the belly of a great Fish. 5ly. They will not become home Sick as is sometimes the Case when Men live in the Open World . . . since the reflections which must naturally arise from their present habitation, will lea them to the more noble thoughts of employing their leizure hours in filling their knapsacks with such materials as may be necessary on the Jorney to another Home.

Dec. 14th. Prisoners & Deserters are continually coming in. The Army who have been surprisingly healthy hitherto . . . now begin to grow sickly from the continued fatigues they have suffered this Campaign. Yet they still show spirit of Alacrity & Contentment not to be expected from so young Troops. I am Sick . . . discontented . . . and out of humour. Poor food . . . hard lodging . . . Cold Weather . . . fatigue . . . Nasty Cloaths . . . nasty Cookery . . . Vomit half my time . . . smoak'd out of my senses . . . the Devil's in't, I can't Enture it . . . Why are we sent here to starve and freeze What sweet Felicities have I left at home; A charming Wife, pretty Children, Good Beds, good food, good Cookery, all agreeable, all harmonious. Here, all Confusion, smoke Cold, hunger & Filthyness A pox on my bad luck. Here comes a bowl of beef soup, full of burnt leaves and dirt, sickish enough to make a hector spue, away with it Boys, I'll live like the Chameleon upon Air. Poh! Poh! crys Patience within me, you talk like a fool. Your being sick Covers your mind with a Melanchollic Gloom, which makes every thing about you appear gloomy. See the poor Soldier, when in health . . . with what chearfullness he meets his foes and encounters every hardship, if barefoot, he labours thro' the Mud & Cold with a Song in his mouth extolling War & Washington, if his food be bad, he eats it notwithstanding with seeming content, blesses God for a good Stomach . . . and Whisles it into digestion. But harkee Patience, a moment, There comes a Soldier, His bare feet are seen thro' his worn out Shoes, his legs nearly naked from the tatter'd remains of an only pair of stockings, his Breeches not sufficient to cover his Nakedness, his Shirt hanging in Strings, his hair dishevell'd, his face meagre, his whole appearance pictures a person forsaken & discouraged. He comes, and crys with an air of wretchedness & dispair, I am Sick, my feet lame, my legs are sore, my body covered with this tormenting Itch, my Cloaths are worn out, my Constitution is broken, my former Activity is exhausted by fatigue, hunger & Cold . . . I fail fast I shall soon be no more! and all the reward I shall get will be . . . "Poor Will is dead."

People who live at home in Luxury and Ease, quietly possessing their habitations, Enjoying their Wives & families in peace . . . have but a faint Idea of the unpleasing sensations, and continual Anxiety the Man endures who is in a Camp, and is the husband & parent of an agreeable family. These same People are willing we should suffer every thing for their Benefit & advantage . . . and yet are the first to Condemn us for not doing more!

Dec. 15th. Quiet. Eat Pessimens, found myself better for their Lenient Opperation. Went to a house, poor & small, but good food within, eat too much from being so long abstemious, thro' want of palatables. Mankind are never truly thankfull for the Benefits of life, until they have experienc'd the want of them. The Man who has seen misery, knows best how to enjoy good. He who is always at ease & has enough of the Blessings of common life is an Impotent Judge of the feelings of the unfortunate . . .

Dec. 18th. Universal Thanksgiving . . . a Roasted Pig at Night. God be thanked for my health which I have pretty well recovered. How much better should I feel, were I assured my family were in health . . . But the same good Being who graciously preserves me . . . is able to preserve them & bring me to the ardently wish'd for enjoyment of them again.

Rank & Precedence make a good deal of disturbance & confusion in the American Army. The Army are poorly supplied with Provision, occationed it is said by the Neglect of the Commissary of Purchases. Much talk among Officers about discharges. Money has become of too little consequence. The C-ss have not made their Commissions valuable Enough. Heaven avert the bad consequences of these things!! . . .

Dec. 21st. Preparations made for hutts. Provision Scarce. Mr. Ellis went homeward, sent a Letter to my Wife. Heartily wish myself at home, my Skin & eyes are almost spoil'd with continual smoke.

A general cry thro' the Camp this Evening among the Soldiers, "No Meat! No Meat!" the Distant vales Echo'd back the melancholly sound, "No Meat! No Meat!" Immitating the noise of Crows & Owls, also, made a part of the confused Musick.

What have you for Dinners Boys? "Nothing but Fire Cake & Water, Sir." At night, "Gentlemen the Supper is ready." What is your Supper, Lads? "Fire Cake & Water, Sir."

Dec. 22nd. Lay excessive Cold & uncomfortable last Night, my eyes are started out for their Orbits like a Rabbit's eyes, occation'd by a great Cold, and Smoke . . .

It is not in the power of Philosophy however, to convince a man he may be happy and Contented if he will, with a HUNGRY BELLY. Give me Food, Cloaths, Wife & Children, kind Heaven! and I'll be as contented as my Nature will permit me to be.

This Evening a Party with two field pieces were order'd out. At 12 of the Clock at Night, Providence sent us a little Mutton, with which we immediately had some Broth made, & a fine Stomach for same. Ye who Eat Pumkin Pie and Roast Turkies . . . and yet Curse fortune for using you ill . . . Curse her no more . . . least she reduce your Allowance of her favours to a bit of Fire Cake, & a draught of Cold Water, & in Cold Weather too.

23d. The Party that went out last evening not Return'd to Day. This evening an excellent Player on the Violin in that soft kind of Musick which is so finely adapted to stirr up the tender Passions, while he was playing in the next Tent to mine, these kinds of Soft Airs . . . I wish'd to have the Musick Cease . . . And yet dreaded its ceasing, least I should loose sight of these dear Ideas which gave me pain and pleasure at the same instant. Ah Heaven why is it that our harder fate so often deprives us of the enjoyment of what we most wish to enjoy this side of thy brighter realms. There is something in this strong passion of Love far more agreeable than what we can derive from any of the other Passions, and which Duller Souls & Cheerless minds are insensible of, & laugh at, let such fools laugh at me . . .

Dec. 25th, Christmas. We are still in Tents, when we ought to be in huts, the poor Sick, suffer much in Tents this cold Weather. But we now treat them differently from what they used to be at home, under the inspection of Old Women & Doct. Bolus Linctus. We give them Mtton & Grogg and a Capital Medicine once in a While, to start the Disease from its foundation at once. We avoid Piddling Pills, Powders, Bolus's Linctus; Cordials, and all such insignificant matters whose powers are Only render'd important by causing the Patient to vomit up his money instead of his disease. But very few of the sick Men Die.

Dec. 26th. Party of the 22d not Return'd. The Enemy have been some Days the west Schuylkill from Opposite the City to Derby. There intentions not yet known. The City is at present pretty Clear of them. Why don't his Excellency rush in & retake the City, in which he will doubtless find much Plunder? Because he knows better than to leave his Post and be catch'd like a d-d fool cooped up in the City. He has always acted wisely hitherto . . . His conduct when closely scrutinised is uncensurable. Were his Inferior Generals as skillfull as himself, we should have the grandest Choir of Officers ever God made. Many Country Gentlemen in the interior parts of the States, who get wrong information of the Affairs & state of our Camp, are very much Surprized at G. Washington's delay to drive off the Enemy, being fals'ly inform'd that his Army consists of double the Number of the Enemy's, such wrong information serve not to keep up the spirit of the People as they must be by and by undeceiv'd to there no small disappointment; it brings blame on his Excellency, who is deserving of the greatest encomiums; it brings disgrace on the Continental Troops, who have never evidenced the least backwardness in doing their duty but on the contrary, have cheerfully endur'd a long and very fatigueing Campaign. 'Tis true they have fought but little this Campaign; this is not owing to any Unwillingness in Officers or Soldiers but for want of convenient Oppertunities, which have not offer'd themselves this Season; tho' this may be contradicted by many; but Impartial Truth in future History will clear up these points, and reflect lasting honur on the Wisdom and prudence of Genl. Washington.

Dec. 28th. The present Circumstances of the Soldier is better by far than the Officer for the family of the Soldier is provided for at the public expence if the Articles they want are above the common price, but the Officer's family, are obliged not only to beg in the most humble manner for the necessaries of Life, but also to pay for them afterwards at the most exorbitant rates and even in this manner, many of them who depend entirely on their Money, cannot procure half the material comforts that are wanted in a family, this produces continual letters of complaint from home. When the Officer has been fatiguing thro' wet and cold and returns to his tent where he finds a letter directed to him from his Wife fill'd with the most heart aching tender Complaints, a Woman is capable of writing. Acquainting him with the incredible difficulty with which she procures a little Bread for herself & Children and finally concluding with expressions bordering on dispair, of procuring a sufficiency of food to keep soul and Body together through the Winter, that her money is of very little consequence to her that she begs of him to consider that Charity begins at home and not suffer his family to perish with want, in the midst of plenty. When such, I say, is the tidings they constantly hear from their families. What man is there, who has the least regard for his family, whose soul would not shrink within him? Who would not be disheartened from persevering in the best of Causes, the Cause of his Country, when such discouragements as these ly in his way, which his Country might remedy if they would? . . .

So much talk about discharges among the Officers & so many are discharged, his E-y lately expressed his fears of being left Alone with the Soldiers only. Strange that our Country will not exert themselves for his support, and save so good, so great a Man from entertaining the least anxious doubt of their Virtue and perseverance in supporting a Cause of such unparallel'd importance!!

All Hell couldn't prevail against us, If Heaven continues no more than its former blessings and if we keep up the Credit of our Money which has now become of the last consequence. If its Credit sinks but a few degrees more, we shall then repent when 'tis too late & cry out for help when no one will appear to deliver. We who are in Camp, and depend on our Money entirely to procure the comforts of life, feel the Importance of this matter, He who is hoarding it up in his Chest, thinks little more of it than how he shall procure more.

Dec. 30th. Eleven Deserters came in to-day, some Hessians & some English . . . one of the Hes$^{ns}$ took an Ax in his hand & cut away the Ice of the Schuylkill which is 1½ inches thick & 40 Rod wide and waded through to our Camp, he was ½ an hour in the Water. They had a promise when they engag'd that the war would be ended in one year, they were now tired of the Service . . .

Dec. 31st. Adjutant Selden learn'd me how to darn stockings, to make them look like knit work, first work the Thread in a parallel manner, then catch these over & over as above.

Valley Forge, Dec. 31st, 1777.

Doct. Waldo Surgeon of Col. Prentices Regt., is recommended for a Furlow.

J. Huntington, B. General

Apply'd with the above for a furlow, to Doct. Cochran, who reply'd, "I am willing to oblige every Gentleman of the Faculty, but some of the Boston Surgeons have by taking an underhand method of getting furlows, occation'd a Complaint to be lodg'd with his E-y, who has positively forbid my giving any furlows at present. We shall soon have regimental Hospitals erected, and general Ones to receive the superabundant Sick from them; if you will tarry till such regulations are made, you will have an honourable furlow, and even now, I will, if you desire it, recommend you to his Excellency for one but desire you would stay a little while longer, and in the mean time, recommend to me some young Surgeon for a Regiment, and I will immediately appoint him to a chief Surgeoncy from your recommendation, I shall remember the rascals who have used me ill."

I concluded to stay, & immediately set about fixing accommodations for the Sick &c. &c.

We got some Spirits and finish'd the Year with a good Drink & thankfull hearts in our new Hutt, which stands on an Eminence that overlooks the Brigade, & in sight of the front Line. The Major and Commissary Little are to live with us which makes our Hutt Head Quarters.

In the Evening I joyfully received a Letter from my good & loving Wife. The pleasure and satisfaction a man enjoys upon hearing of the health & peace of a Friend, and more especially of a Wife, on whose affections & peace his own happiness depends, is a greater pleasure than . . . 1778. Jan. 1st.

Bought an embroidered Jacket.

How much we affect to appear of consequence by a superfluous Dress, and yet Custom (that law which none may fight against), has rendered this absolutely necessary & commendable. An Officer frequently fails of being duly noticed, merely from the want of a genteel Dress; and if joined to this, he has a bungling Address, his situation is renderd very disagreeable. Neatness of Dress, void of unnecessary superfluities is very becoming and discovers a man at least to have some Ambition without which he will never make any figure in life. A man Appears to much greater advantage, especially among strangers, with a genteel Dress, which will naturally prepossess the Company in his favour, before they hear him speak. In this way, even the fool may pass for a man of consequence. A man ought always to dress according to his business let his Abilities be what they will; for if his Business is not sufficient to support a Credible appearance in the world, let him discontinue it and undertake some other branch . . .

Jan. 3d. Our Hutt, or rather our Hermits Cell, goes on briskly, having a short allowance of Bread this morning we divided it with great precision, eat our Breakfast with thankfull hearts for the little we had, took care of the Sick, according to our dayly practice, and went to Work on our little humble Cottage. Now ye poets give me my Wife & Children, with your daisies, your Roses, your Tuleps and your other insignificant poetical materials, & I believe I should be pretty contented in this humble Cottage which the muses have so often described.

Another Ship was taken from the Enemy this Week, the lading taken out & the Ship burnt. The other Ship mention'd New Years day, was loaded with Officers Baggage and Medicines, with other valluable matters, & Cloathing for 2000 men Compleat . . .

Sunday, Jan. 4th. Properly accouter'd [went to work at Masonry, None of my Mess were to dictate me, and before Night being found with Mortar & Stone] I almost compleated a genteel Chimney to my Magnificent Hutt, however, as we had short allowance of food & no Grogg, my back ached before Night . . .

The Marquis De la Fayette, a Volunteer in Our Army, & he who gave three Ships to Congress, is very agreeable in his person and great in his Character; being made a Major General, Brigadier Conway, an Irish Colonel from France, took umbrage therat, and resigned but is now made Inspector General of the Army, he is a great Character, he wore a Commission in the French Service when he was but ten years old. Major General Lord Stirling, is a man of a very noble presence, and the most martial Appearance of any General in the Service, he much resembles the Marquis of Granby, by his bald head & the make of his face and figure of his Body. He is mild in his private Conversation, and vociferous in the Field; but he has allways been unfortunate in Actions.

Count Polaski, General of the Horse is a Man of hardly middling Stature, sharp Countenance, and lively air; He contended a long time with his Uncle the present king of Polande for the Crown but being overcome he fled to France and has now joined the American Army, where he is still greatly respected & admired for his Martial Skill, Courage & Intrepidity. Gen$^{l}$. Green & Gen$^{l}$. Sullivan are greatly esteemed. Baron De Kalb, a Major General is another very remarkable Character, and a Gentleman much esteemed.

Jany. 5th. Apply'd for a Furlow, Surgn. Genl. not at home, came back mumping & Sulkey.

Jany. 6th. Apply'd again, was deny'd by reason of Inoculations being set on foot, & because the Boston Surgeons had too many of them gone, one of whom is to be broke for lying & deceiving in order to get a furlow and I wish his cursed tongue was pull'd out, for thus giving an example of scandal to the New England Surgeons, tho' the Connect^t Ones are well enough respected at present. Came home sulkey and Cross, storm'd at the boys, and swore round like a piper and a fool till most Night, when I bought me a Bear Skin, dress'd with the Hair on: This will answer me to ly on . . .

The Brigg taken from the Enemy [& mention'd New Year's Day] is the greatest prize ever taken from them. There is Scarlet, Blue, & Buff Cloth, sufficient to Cloath all the Officers of the Army, & Hats, Shirts, Stockings, Shoes, Boots, Spurs &c. to finish compleat Suits for all. A petition is to his Excellency, that this Cloathing may be dealt out to the Regimental Officers only, at a moderate price, Excluding Commissaries, Bull Drivers &c. there are 4 or 5000 Apelets of Gold & Silver, Many Chests of private Officers Baggage, & General How's Silver Plate, & Kitchen furniture, &c. This Cargo was sent to Cloathe all the Officers of the British Army.

8th. Unexpectedly got a Furlow. Set out for home. The very worst of Riding, Mud & Mire.

We had gone thro' Inoculation before this furlow.

A further record of Doctor Waldo's sojourn in camp is found in a somewhat lengthy poem which he sent to his wife. It is entitled "Valley Forge" and is dated April twenty-sixth, 1778. Certain parts of this are not without historical value such as the description of the hut in which he and his companions lived. In part this is as follows:

My humble hut demands a right
To have its matter, birth and site
Described first! Of pondrous logs
Whose bulk disdains the winds or fogs
The sides and ends are fitly raised
And by dove-tail each corner's brac'd;
Athwart the roof, young saplings lie
Which fire and smoke has now made dry
Next, straw wraps o'er the tender pole,
Next earth, then splints o'erlay the whole;
Although it leaks when show'rs are o'er
It did not leak two hours before.
Two chimneys plac'd at op'site angles
Keep smoke from causing oaths and wrangles . . .

Our floors of sturdy timber made,
Cleav'd from the oak and level laid;
Those cracks where zephyrs oft would play
Are tightly closed with plastic clay;
Three windows, placed all in sight,
Through oiled paper give us light;
One door, on wooden hinges hung,
Lets in the friend, or sickly throng;
By wedge and beetle's splitting force
The oaken planks are made, though coarse,
By which is formed a strong partition
That keeps us in a snug condition;
Divides the kitchen from the hall
Though both are equal, and both small,
Yet there the cook prepares the board,
Here serves it up as to a lord,
There knives and spoons and kettles rattle
While here we talk of war and battle,
There is the chat and fun of boys
Here pensive thoughts or friendship's joys,
There flights of fancy youths pursue
While here I set and think of YOU!

Albigence Waldo shared the great love and reverence that the soldiers had for their Commander and wrote:

Oh, WASHINGTON. What soul like thine,
If aught below can be divine,
'Tis thou! 'in every instance try'd
Above all passion, pain, or pride,
Or pow'r, or rage of public breath,
Vile Lucre,' or the dread of Death.

Waldo's admiration for the great man seems to have been somewhat reciprocal, for Washington employed him to copy orders for the troops and presented him with a sword. Other portions of this literary effort describe the drill maneuvers:

Evolutions grand go through
When all the varying glitters shew,
Of guns and bayonets, polished bright
Which dazzle the spectator's sight.

The diversions of the soldiers off duty come in for a share, and these seem to have included football, cricket and bowling. The hardships of tent life in bad weather and a battle are described. The poem closes with a complaint of the want of female society and the whole is designated a "new Narrative love-letter" as the author concludes:

Thus, Celia! I have brief related
Th' unpleasing scenes to which we're fated,
Accept it as a real proof
Of my affection and my love.
Nor think that I, who am so lazy
Would e'er have wrote so much to please ye
Was not my friendship for you more
Than e'er a husband's was before.

The next year while Dr. Waldo was campaigning with the troops his family became reduced to a state of real poverty and it was on a furlough, in 1779, that he became aware of their true condition. This state of home affairs led him to resign his commission, which he did during the winter of that year. He says "with half broken constitution" that he "dropped the soldier's cockade, and with it dropped the heartfelt tear."

The practice at Pomfret was resumed and his renown as a surgeon, which was particularly enhanced by his service at Valley Forge, soon became widespread. A confrere says "he sustained the position of the most eminent surgeon of his district." Not only in Connecticut but in adjoining states his fame was known. The following letter from an eminent contemporary is interesting.

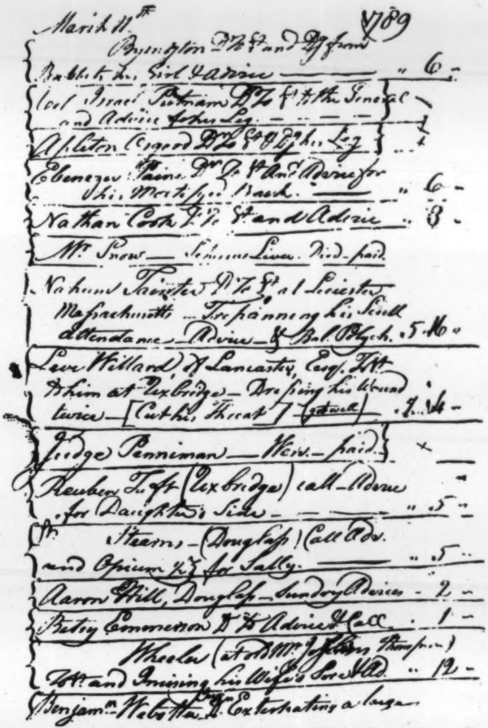
Leicester, Feb. 7. 1793.

Dear Sir, About sun-set, this day, my eldest son received a kick from a horse, which has fractured his cranium. This is, therefore, in the name of your devoted friend, desiring you to make no delay in making us a visit. For God's sake, fail not! but let dispatch and dexterity hasten you. I am in confusion, and know not what to say further. Only fail not. In haste, 8 o'clock P.M. Yours, &c.,

Austin Flint.

Dr. Albigence Waldo

The boy with the fractured cranium recovered, and American medicine owes a debt to Albigence Waldo which is not to be evaluated. Dr. Waldo, after the fashion of his time, had pupils who attended him in his practice. Among these was Thomas Hubbard, who succeeded him in Pomfret and later, in 1829, became Professor of Surgery in the Yale Medical School.



March 11th 1789
[illegible] Dr to [illegible] and [illegible] from
Babbit [illegible] Girl & Advice — " 6 –
Col. Israel Putnam Dr to [illegible] the General
and Advice for the Leg — — —
Appleton Osgood Dr to [illegible] Leg
Ebenezer Paine Dr to [illegible] and Advice for
[illegible] Mortified Back. — " 6 –
Nathan Cook Dr to [illegible] and Advice .. 3 –
Mr Snow — [illegible] Liver. [illegible] – paid
Nahum [illegible] Dr to [illegible] Leicester
Massachusetts — Trepanning his Skull
attendance — Advice — & [illegible] . 5 . 16 .
Levi Willard of Lancaster, Esq. [illegible]
him at Uxbridge — Dressing his Wound
twice — [Cut his Throat] [illegible] . 9 . 14 –
Judge Penniman — [illegible] — paid ×
Reuben Taft (Uxbridge) call — Advice
for Daughter's Side — — " . 5 –
[illegible] Stearns — (Douglass) Call Adv.
and Opium [illegible] for Sally. — " . 5 .
Aaron Hill, Douglass — Sundry Advices – 2 –
Betsy Emmerson Dr to Advice & Call . 1 –
Wheeler (at old Mr. [illegible] Thompson)
[illegible] and Dressing his Wife's Sore [illegible] .. 12 –
Benjamin Webster Dr to Extirpating a large

PHOTOGRAPH OF A PAGE FROM THE "DAY BOOK" OF DR. ALBIGENCE WALDO.

The extent of his practice and his skill in surgery were phenomenal for his time and place. It has recently been the great pleasure of the author of this essay to examine one of the Day-Books which Dr. Waldo kept during the years 1782–89. This has been made possible through the kindness of the present owner, Dr. Seldom B. Overlock of Pomfret, a worthy successor to Albigence Waldo, surgeon. In the perusal of this valuable manuscript, a number of things impress us relating to Dr. Waldo and the practice of surgery. First, he was a "specialist" in surgery, devoting his whole time to this branch of medicine. Secondly, the type of work which he performed was unsurpassed in magnitude by any surgeon of his time; and finally, we find not only a record of the achievements of an accomplished surgeon, but a most excellent portrayal of surgical practice in New England during the latter part of the eighteenth century. I cannot refrain from inserting some of the illuminating entries taken largely at random:

| | | |
|---|---|---|
| 1782. | | |
| Oct. 21, | David Brook Dr to visit and Incising a large Collection of matter extend$^{g}$ from the knee to hip & open'd inside just above the Vastus, discharging 3 pints thin matter. Cut a branch of the popliteal, felt easy afterward. More could have been press'd out &c. | 1/11/0 |
| Nov. 5 | Darius Aynsworth[1] (W. Woodstock) Dr. to 2 days attendance, scalping his Son and Trepanning, Setting his wrist. Dr. | 4/0/0 |
| 1783 | | |
| Mar. 3 | Salisbury of West Woodstock. Visit and extractg 3 Ulcer'd Teeth for wife & 1 for Daugr. | /9/ |
| Mar. 8 | Nancy Born 8th Day Dawn. | |
| May 6th | Col. Sam. McClellan Dr to Trepanning his son's head and Attend$^{ce}$ one day. | |
| 25 | Jonathan Stone [Thompson, north] Dr to visit to his wife and Incising her Imposthume Breast 4 inches and pro Futuro | /18/ |
| 27 | Lieut. John Holbrook, to his wife who had fell into the Embers and roasted her Arm and incising it 15 inches besides small incisions and Dressing as usual | 2/10/ |
| 29 | Lieut Asa Child Advice for his leg kick'd agreed bushel of wheat in fall | /6/ |
| July 29 | Stephen Redmond (of North Woodstock) Dr to Cutting an Artificial Anus for his Infant three inches up the Body and visit | 1/4/ |
| 1783 | | |
| Nov. 1 | Daniel Perry, To visit and extracting and raising the Fractured part of the Scull of his Child [deceas'd] | |
| Dec. 9 | Went to Claremont [N. Hampshire]<br>Amputated Reuben Spencer's thigh 14th Monday | |
| 1784 | | |
| Feb. 27 | Phillips, Setting his child's knee born inverted. | |
| Mar. 10 | Jacob Dresser, replacing his son Asa's Gutts & Cawl let out by a transverse Wound six inches in length, stitching large Epigastrick Artery and attendance till Fryday 12 & Dressing then | 6/ / |
| 18 | Bought Bucephalus of Thomas Angel for L13,0,0 pay July [later entry, sold the poor creature pretty quick] | |
| Apr. 12 | Oliver Clark of Mansfield Trepanning his Skull &c | 6/ / |
| Apr. 14 | Capt. Amasa Sessions, preparing his shoulder for reduction Dislocated, attended with Constitutional Rigidity & Rheum$^{sm}$. | |
| May 31 | James Bacon Dr. to visit and exterpatg a Strumae from Hezbon's neck below the ears | 1/8/ |
| June 5 | General Israel Putnam Dr to visit and advice for leg | 1/12 |
| July 15 | Henry Lyon [Ashford] Dr to visit and performing the Operation for the Fistulae Lacrymalis for Wife &c | 1/4/ |
| July 29 | Ebenezer Lyon Dr. to Amputating his Boy Gile's Thigh preparing Med. &c | 6/ / |
| Aug. 16 | Stephen Wood Dr. to the Operation for a large Hair Lip on his Child [Dudley] | 1/8/ |

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[1] In the diary of Rev. Stephen Williams Jr. written while he was a Yale undergraduate a description of this operation given. Williams was visiting in Woodstock at the time and notes that Dr. Albigence Waldo, assisted by Drs. Lillie and Morris, trepanned Cyril Ainsworth. Twenty were present at the operation and the Rev. Mr. Williams Sr. made a prayer before Dr. Waldo began.

| | | |
|---|---|---|
| Aug. 26 | Elihu Adams Dr. to Medicine for Sons foot and Advice agreed to half a quarter of Beef | |
| 1785 | | |
| Apr. 17 | Thomas Chapman Jun Dr. to [Westford N. East] visit and Trepanning &c his Daughter's Fractured Skull | 4/ / |
| May 17 | Darius Aynsworth 'W. [Woodstock] Dr. to visits and Trepanning his Son's head [Parietal & Occipital Fract] | 4/ / |
| May 19 | Reuben Buck Dr to Boarding and Chururgicating Zeruiah 12 days | 1/ / |
| Sept 1 | Major Nathaniel Heley [Selectman in behalf of the town of Dudley] Dr to visits and Capt. Curtises performing the Paracentesis for Susan Pond drawing off 60 pints [70 lbs. weight] of thick dark coulered blood serum from her Abdomn [small woman naturally] | 1/10/ |
| Sept 14 | John Gilbert Jun. Dr. to visit and Advice for his burn by a Thunderbolt [or Firery Meteor] | /10/ |
| Dec 13 | Elijah Phillips Dr to visit & Attendance on his child scald and sundry . . . | 1/12/ |
| 14 | Ditto and ——— but the child was given back to its Maker. | |
| Dec 15 | Samuel Stowell Jr. Dr. [Willington] to visit desecting a large encysted Schirrus from his Wife's breast & Sternum Opium and Attendance | 4/ / |
| 1786 | | |
| Jan. 20 | Asa Sharp Cr. by Pair Second hand Gloves | /2/ |
| Mar. 6. | Thankfull Mason Dr to visit setting her shoulder Cr. by cloth for sheets agreed at 20 | /8/ |
| Aug 24 | Benjamin Brown Dr to visit and Setting his Fractur'd Arm<br>Compound Fracture from the Terrible Hurricane or Tornado on this day 5 of Clock P.M. Brown's wife killed. | /15/ |
| Sept 1 | Jacob Tiffany [of Holland Brimfield] Dr to Visit and Chirurgical Operation of his Wife<br>[Injur'd in Delivery by Instruments] | 1/16/ |
| 1787 | | |
| June 6 | Capt Leonard Ingals Dr to visit [Abington] and Exterpating a Strumous Gland from his Neck [ugley] | 2/8/ |
| July 2 | Isaac Luther Sen. Operation for hydrocele for Radical Cure | 1/16/ |
| Nov. 19 | Willard Adams of Brooklyn Dr to Visit and removing a large triangular piece of the Os Frontis. The Whole Fractur'd in a Terrible Manner. A Considerable quantity of the Brain was pressed out thro' the Ethmoid Bones into the Nostrils and Dura Mater was flabby in consequence of this loss underneath | 3/0/0 |
| 23 | Willard Adams Dr to visit and dressing his head took out considerable brains which came from the laceration of the Dura Mater at its juncture with the Nostrils or Ethmoid | 1/16/ |
| 25 | . . . Dressing his head, discharg'd well. Sinuses to each temple to the top of the orbits &c Frontis all loose | 1/ / |
| 27 | The Os Frontis at its Suture with The Temple Nose &c being quite loose, some hope appears of its joining again[1] | 1/10/ |
| Dec. 13 | Col. Israel Putnam Dr. to Visit to the General and Dressg his wounds of the head, a fall on the ice | 1/18/ |
| 1788 | | |
| Jan. 25. | Went to Worcester Treppanned Mr. Ward | |
| May 29 | Wid. Knowlton Dr to visit dressing her son extractg a large Splint of Skull pushed under the Os Occipitus | /12/ |

[1] This patient subsequently recovered and a year later is treated again for a minor disorder. H. T.

| | | |
|---|---|---|
| June 8 | Asa Laurence Dr to Visit Desecting his Anthrax and dressing cum Empl. Waldo | /18/ |
| Nov 28 | Ingoldby Works [Ashford] Trepanning his son. Fractured large in Temple, brains came out | 3/ / |
| Nov 28 | Nathaniel Child Esq Bleeding and Advising Beet Tea for discharge of Blood Per urethra (cur'd him) | /6/ |
| Dec 22 | Byington ——— Amputating his hand maiden's thigh [age 16] | 6/ / |
| 26 | Mark Stacey Dr. to Cutting, Pinning & Desecting a Monstrous, Hare Lip [Sturbridge] | 1/8/ |
| 1789 | | |
| Jan. 1 | Arrived at Earl Cuttings in Gerry, Massachusetts & Amputated his Thigh the 2nd [Settled by Note] | |
| Jan 24 | Byington Call and Advice and dressing Betty [Neglected poor Girl!] Not by Me. | /5/ |
| Mar 11 | Levi Willard of Lancaster, to him at Uxbridge Dressing his wound twice [Cut his Throat] [got well] | 1/4/ |
| May 21 | Richard Alverson of Smithfield at Smith Sayles Visit and Operation for an Empyema, his heart being crowded from its place by the Abundant Extravasated Lymph, beat only at the right pap. | 4/10/ |
| June 2 | David Sears [Ashford] Exterpating part of a schirrus from the Axilla connected with the Axill. Artery for his wife and Emplastrum Waldo. | 1/10/ |
| June 10 | Noah Hill [of Douglass] desecting from the insertion of the Tendons of the wrist near the pulse a gangleonoide Tumour, Boarding and dressing him from the 6th to the 20th of May ult. | 2/3/ |
| Aug 20 | Abel Bartlett of Cumberland R I Visit and Cutting him for Fistula in Ano, desecting mortifyed flesh and Consultation & Advice<br>36 miles | 5/11/ |
| Dec 19 | Henry Stone [Situate R. Island] Visit and Consultation three days on his case [Compound fracture of the leg by the falling of a Tree] Lacerations, Gangrene, Pain, Inflammation, Suppuration Extravasation, and all manner of trouble. | 3/6/ |

Inside the back cover of this Day-Book, Dr. Waldo has recorded some observations on the weather, crops, etc. Some of the more interesting of these follow:

1784 Sept 25th and 27th. A great plenty of Cyder is like to be made this Season but the Indian Corn in General is not filled at the extremity of the Ears as they generally are, ending in a Sharper point than usual N.B. Money and Virtue Rare. Religion mor Talk'd of than practised. And what are the natural concommittants of a National peace. Triffles make quarrels, and Mice swell to the magnitude of Elephants.

Decemb 18th Continued fine Pleasant Weather. but one snow yet which lasted in the Ground about 8 days; in general there's no more occation for Mittens than in September.

April 7 1785 A Large body of Snow now lies on the ground thro New England; in many places 2 feet deep on a level. This snow has lain this two months in which time as well as the Chief of the past Winter it has been extraordinary good Slaying &C &C &C.

May 1st 1784 [Pomfret] Not a Blossom to be seen. Cowslips just out of the Ground. The winter has been seven months long, cold, stormy, and very uncommonly hard. Farmers began their spring work of fencing and plowing but a week ago in which it has also been cold and unspringlike. Many snows In April, ground froze chief the month, great scarcity of hay universally.

If the reader is familiar with present day surgical procedure, I think he will agree with me that the man who could perform amputations at the thigh, treat surgically fractures of the cranium, and excise goitres, at a time before anesthesia was even dreamed of, was an accomplished surgeon of a very high order. Such a one was Albigence Waldo and accomplished when he was, from a professional standpoint, a comparatively young man.

Before we conclude these remarks, it is fitting that certain other facts of his life should be mentioned. He was twice married. His first wife died February seventeenth, 1785, and he later married Lucy Cargill (July sixth, 1787). Two daughters were born to this union, and his widow survived him until 1830.

Dr. Waldo was a member of the Congregational church, and on the first page of the articles of confession he has left us the following record of his faith:

> A Couple of Reasons for my signing the enclosed agreements,
>
> First, I, having examined with great carefulness, find it to be founded on that great Christian scale which unites mankind in the finely polished golden chain of Equality and Brotherly Love; and cannot in my heart make any material objections to the modes and principles which it is designated to inculcate. If this reason is not sufficient, the second may peaceably be admitted.
>
> Second. My only brother has signed it after due consideration, and I wish to worship and get to heaven with my Brother.

Dr. Waldo was throughout his life an ardent admirer of the famous townsman, Putnam, whose life written by David Humphreys has so thrilled generations of American boys. He was an intimate friend of Humphreys and the latter in a letter acknowledged the help that was given to him by Waldo in furnishing material for the biography.

When the Windham County Medical Society was formed in 1791, Waldo, who served as clerk, was undoubtedly the chief influence in forming that association. At the age of forty-four years of age, Dr. Waldo died, and is buried in his native town. His funeral was conducted by the local Masonic Society in which he was ever active. The address on that occasion was delivered by his first commanding officer, General McClellan. Upon the monument which marks his resting place are inscribed these words:

> The Master Wardens and Brethren
> of Moriah Lodge,
> In testimony of their esteem & respect
> For the virtues, talents, and usefulness
> Of their late worthy Brother,
> Erect this Monument
> To the Memory
> Of ALBIGENCE WALDO, Surgeon,
> Who, attentively studying the Works of God
> In the admirable frame of man,
> Rose to eminent distinction
> In the noble art of healing;
> His name was Charity;
> His actions, Humanity;
> His intercourse with men, benevolence & love.
> Born in Pomfret, Feb: 27th, 1750;
> Died 29th, Jan. 1794.

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[From Crooke: A Description of the Body of Man. London, 1631.]

# EDITORIALS

## HARVEY AND THE TERCENTENARY CELEBRATION OF THE ROYAL COLLEGE OF PHYSICIANS OF LONDON

The anniversaries of the births or deaths of famous men are the frequent occasions of celebrations in their honor but the celebration of the date of publication of a book is not so frequent if we except the publication of anniversary editions. In 1923 the Tercentenary of the publication of the First Folio of Shakespeare's works was marked by several ceremonial occasions in England and elsewhere and by the publication of a number of books bearing on Shakespeare and his works. We believe that William Harvey's book is the first medical work to be thus honored and it was most appropriate that the greatest function in its honor should be organized and held in the Hall of the Royal College of Physicians of London, of which he was not only one of the most illustrious Fellows but also one of the greatest benefactors.

In 1607 Harvey became a Fellow of the Royal College of Physicians of London and eight years later he was appointed by it to deliver the Lumleian lectures. The lecturer was elected for life and received a salary equal to that paid to the Regius Professors at Oxford and Cambridge. The lectures were given twice a week on Wednesdays and Fridays. Each lecture lasted one hour, of which three quarters were to be devoted to reading in Latin, and the remaining quarter in English. The lectures were arranged in cycles and a complete course took six years for its completion. The original notes of Harvey's first course of lectures on anatomy in his own handwriting are preserved in the Manuscript Department of the British Museum. They had been in the collection of Sir Hans Sloane. The manuscript has had a curious history. For some years it was known to be in the Museum and was frequently studied. It then mysteriously disappeared and for many years was given up as lost. In 1876 it was found among some duplicate books which the Museum was going to sell. A facsimile of the "Notes" was published in 1886 and the original can, of course, be seen in the British Museum. The notes are written on both sides of the paper and the leaves are so arranged that additional pages can be inserted. They are bound in leather. As Sir D'Arcy Power says, Harvey "wrote so badly and the notes are so full of abbreviations, interlineations, and alterations, as to render them useless to anyone but the author." Harvey probably began his lectures on the surgical part of his course in August, 1615, shortly after his appointment but his first anatomical lectures were not given until April, 1616. I will quote but one passage which will suffice to show that at that time, twelve years before the publication of the "De Motu Cordis," he had already conceived his great idea of the circulation of the blood:

> It is plain from the structure of the heart that the blood is passed continuously through the lungs to the aorta as by the two clacks of a water bellows to raise water.
>
> It is shown by the application of a ligature that the passage of the blood is from the arteries into the veins.
>
> Whence it follows that the movement of the blood is constantly in a circle, and is brought about by the beat of the heart.[1]

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[1] It is interesting to note that these lectures were first delivered by Harvey, Tuesday, Wednesday and Thursday, April 16, 17 and 18, 1616. On the following Tuesday, April 23, Shakespeare died.

In his address to the President and Fellows of the College of Physicians which precedes the text of the "De Motu Cordis," Harvey says:

> I did open many times before, worthy Mr-Doctor, my opinion concerning the motion and use of the heart and Circulation of the blood new in my lectures, but being confirm'd by ocular demonstration for nine years and more in your sight, evidenced by reasons and arguments, freed from the objections of the most learned and skilful Anatomists, desired by some, and most earnestly required by others, we have at last set it out to view in this little Book, which, unless it were pass'd through your hands, I could hardly hope that it would come abroad entire and safe, since I can call most of you, being worthy of credit, as witnesses of those observations from which I gather proof or confute error, who saw many of my Dissections, and in the ocular demonstrations of these things which I here assert to the senses were used to stand by and assist me.

In this connection it is worthy of note that though we know that Harvey's work awoke great opposition, nevertheless none of his colleagues in the Royal College of Physicians came out openly against him, notwithstanding the statement made many years later by Harvey himself "that no man over the age of forty accepted it." Aubrey, the famous but not too reliable gossip of his time wrote that his practice fell off mightily as it was "believed by the vulgar that he was crackbrained, and all the physicians were against him." He was also nicknamed the "circulator," the word being used in its old Latin sense signifying a quack. James Primrose, one of his most malignant opponents, was examined by Harvey when an "Elect" of the College, and received his approval for a license to practise medicine. There is no reason to think that he attended Harvey's lectures.

Although Harvey retired from active practice in 1648 he continued to deliver the Lumleian lectures; in 1655 he resigned.

Harvey was much loved and honored by the Fellows of the College. At various times he was elected Censor, Elect, and Treasurer of the College and in 1654 the Fellows chose him to be their President, but he declined the office on the plea of age and ill-health. In his turn he was a most generous benefactor to the College. In 1651 he offered to erect a building to serve the College as a museum and library. When this building was completed in 1653, Harvey received the President and Fellows at a splendid entertainment, at the conclusion of which he turned over to the College the title deeds of his gift. This building was destroyed in the Great Fire in 1666.

The celebration of the Tercentenary of the "De Motu Cordis" was officially opened on Monday, May 14, when the delegates were received by the King at Buckingham Palace. The ceremony was brief but impressive. Sir John Rose Bradford, the President of the Royal College of Physicians, read an address to which the King replied, and then each delegate in turn was presented to his Majesty, and received a cordial handshake.

In the afternoon Sir John Rose Bradford received the delegates officially in the Hall of the College. All those attending wore their academic robes and these in their multiple variety of fashion and color lent a picturesque brilliancy to the scene which relieved the academic soberness of the occasion. The President of the College, bearing the caduceus which is his official symbol and preceded by the beadle carrying a great mace, seated himself in the presidential chair and the delegates were presented to him, each one's name being loudly announced as he advanced to present the address of congratulation to the College from the institution which he represented. Some Honorary Fellowships in the College were then conferred, after which Professor Keibel, of Berlin, Professor Chauffard, of Paris and Sir Charles Sherrington read eulogies of Harvey, and the meeting was adjourned.

The evening was marked by a delightful dinner given to the delegates by the Master and Wardens of the Worshipful Company of

Grocers in their splendid Hall, and by an "At Home" at Lady Bradford's.

On Tuesday morning, May 15, a most interesting series of demonstrations showing the mechanism of the circulation were given at University College by various members of the staff, and a film, prepared by Sir Thomas Lewis and Dr. H. H. Dale, was exhibited illustrating the experiments performed by Harvey by which he was able to prove his theory of the circulation of the blood. This most beautiful moving picture was greatly appreciated by all who were privileged to see it and the hope was generally expressed that an arrangement might be brought about by which it would be rendered available to other institutions for teaching purposes. Only the hands of the experimenter were visible in the picture as he proceeded to lay bare the veins and arteries and the heart of various animals and then show by ligation and pressure the course of the blood and the nature of the movements of the heart. One felt that one was actually watching Harvey himself in his great investigation. After this interesting moving picture there was a delightful luncheon at St. Bartholomew's Hospital. There in the beautiful great hall, surrounded by a splendid array of portraits of former governors and members of the staff of the hospital the guests listened to a most admirable address by Sir Wilmot Herringham, on Harvey's connection with St. Bartholomew's Hospital.

In 1608 Harvey received the reversion to the position of Physician to St. Bartholomew's Hospital, that is to say was elected by the Governors to succeed to that position whenever it should be vacated by Dr. Wilkinson, who was the physician to the hospital. In the meantime he acted as his substitute in case of his being unable for any cause, such as sickness or absence, to perform his duties. Dr. Wilkinson died in the summer of 1609 and Harvey was appointed Physician to the hospital on October 14 of the same year. The position carried with it a stipend of twenty-five pounds a year and an official residence in West Smithfield for which the holder paid a rent to the Governors of the hospital. Dr. Harvey did not occupy the property, probably because his own house was in Ludgate near the hospital; the Governors in lieu thereof increased his salary to £33 6s. 8d.

As an indication of the closeness of Harvey's relation with King Charles I we find that on October 15, 1633, the Governors passed the following resolution:

> And forasmuch as Dr. Harvey, the now physician to this hospital, is also chosen to be physician to his Majesty, and (is) thereby tied to daily service and attendance on his Majesty.
>
> It hath been thought fit and so ordered, that there shall be for this present occasion two physicians for this hospital. And that Dr. Andrewes, physician in reversion, be now admitted to be also an immediate physician to this hospital. And to have the salary or yearly fee of £33 6s. 8d. for his pains henceforth during the pleasure of this court.
>
> And this court, for the long service of the said Dr. Harvey to this hospital, and in consideration that he is physician to his Majesty do give and allow him leave and liberty to dispose of himself and time, and to visit the poor no oftener than he in his discretion shall think fit.[1]

From the above we may see that the Court of Governors of St. Bartholomew's Hospital had a due appreciation of the services rendered to the hospital by its great physician. Sir D'Arcy Power also quotes a number of orders or articles presented to the Court of Governors on the same day by Dr. Harvey in which are several directed toward holding the surgeons to the hospital in due subordination to the physicians, a point about which Harvey was evidently much concerned. These regulations suggested by Harvey were adopted by the court. As before mentioned, in 1643 Harvey lost or gave up his position as Physician to St. Bartholomew's, because the Commonwealth party was in control of affairs in London and he was absent at Oxford with the King.

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[1] Power, Sir D'Arcy. William Harvey. p. 97.

In the afternoon there was a reception at the College of Physicians at which the rich collection of its treasures was displayed. Among those of special interest were a number relating to Harvey. They included many of the early, rare editions of his works, among them the first edition of the "De Motu Cordis" printed at Frankfurt in 1628, a series of eleven autograph letters of Harvey addressed to Lord Fielding, written during his travels with Lord Arundel[1]; the famous portrait of Harvey by Cornelius Jansen, Harvey's diploma from the University of Padua, bearing the signature of Fabricius ab Aquapendente, and the ebony pointer used by Harvey in demonstrating his lectures. There were a number of interesting objects associated with the College itself, such as panelling removed from the walls of the old home of the College in Warwick Lane, dating from 1674, when it was presented by Dr. Baldwin Hamey; a stone bearing the arms of the College which was removed from Linacre's house in Knightrider Street, where it was let into the wall of the house with the arms carved upon it. It may be recalled that Linacre was the founder and first president of the College, and during its earlier years its meetings were held in his house. Among the most cherished relics is the famous "Gold-Headed Cane," which after being successively in the possession of Drs. Radcliffe, Mead, Askew, Pitcairn and Matthew Baillie, was presented by the latter's widow to Sir Henry Halford, who in turn gave it to the College. The arms of its former owners are engraved upon it. Its imaginary history is familiar to us all in the fascinating pages in which its supposed autobiography was written by William Macmichael. The silver-gilt mace, presented to the College in 1683, which is carried before the President of the College on all official occasions, was presented to the College by Dr. John Lawson in 1683.

Side by side on a cushion with the silver-gilt mace, lay the caduceus, a silver wand, designed by Dr. Caius about 1556, and carried by the President himself when acting in his official capacity.

Among its manuscripts the College exhibited the first book of its Statutes, and the first book of the Annals of the College in the hand-writing of Dr. Caius; the Signature Book of the Fellows dating from 1647; Sydenham's Notebook in his own handwriting; a manuscript of Chaucer's "Canterbury Tales," probably the third in point of time, and the "Wilton Abbey Psalter," written about 1250.

The College is rich in incunabula, not all of them strictly medical. Thus it has the Nuremberg Bible of 1475, and two others printed respectively in 1480 and 1485, Caxton's "Recuyell of the Historyes of Troye," and the first printed edition of Homer.

The walls of the College are adorned with a wonderful collection of portraits, many of them by famous artists. We can only single out a few for particular mention, such as Dr. Thomas Wharton, by Van Dyck; Dr. Richard Warren, by Gainsborough; Drs. Matthew Baillie and David Pitcairn, by J. Hoppner; Dr. William Pitcairn, by Sir Joshua Reynolds; Sir Samuel Garth, by Sir Godfrey Kneller; Edward Jenner, by Sir Thomas Lawrence; and King Edward VII, by Sir Luke Fildes. These will suffice to indicate the value of the collection from the artistic as well as the historic point of view.

In the evening there was a *conversazione* which was attended by the delegates, guests, Fellows of the College and their ladies at the Hall of the Worshipful Company of Merchant Taylors, at which the Prince of Wales was present and greeted the delegates as they were individually presented to him. The Prince made a most delightful impression on all those who had the honor of being introduced. The cordial way in which he said a few appropriate words to each individual showed that he possessed much of the social tact for which his grandfather was so famous.

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[1] These letters have recently been studied and described by Sir D'Arcy Power, *Proc. Roy. Soc. Med.*, 1916, vol. x, Section of the History of Medicine.

On Wednesday, May 16, a truly magnificent dinner was given by the President and Fellows of the College in the Guildhall of the City of London. Many distinguished guests outside of the medical profession were present and we can only state that the dinner fully justified all our anticipations of what a Guildhall banquet might be. From the turtle soup to the savory the great fame of a feast in London's municipal hall was amply sustained.

On Thursday, May 17, the delegates and their ladies were taken to Oxford, where they were entertained at luncheon by the Warden and Fellows of Merton College, of which Harvey was Warden from April 7, 1645 to June 24, 1646. The only personal records of Harvey's wardenship which remain at Merton College are a couple of signatures of some accounts. He did not keep the College Register in his own handwriting, as was customary, but employed an amanuensis. The records show that his nomination by the King to the position met with considerable opposition. During the brief period that he held the wardenship of Merton College he is said to have spent most of his time at Trinity College with Dr. Bathurst studying the incubation of fowls. The Queen occupied the Warden's House from 1643 to 1646 and visitors are still shown "the Queen's room." It is curious as showing the animosity against Harvey and the Royalists that his name was omitted from its proper place in the List of Wardens contained in the "Old Catalogue," but has been inserted in a hand belonging to the first half of the eighteenth century. The visitors were also taken to see some of the objects of interest to be found in that most interesting of places.

On Friday May 17, a similar visit was paid to Harvey's *alma mater*, Cambridge, where the guests were given a luncheon by the Master and Fellows of Caius' College, where Harvey graduated. Those who went down by motor made a detour in order that they might visit the old church at Hempstead in which Harvey lies buried. This visit was very interesting but saddened by the prospect of the ruin of the church tower and the bad condition of the Harvey vault. It is to be hoped that the effort now projected to raise funds to restore the edifice and repair the vault will be pushed. I feel sure that the medical profession of the United States would gladly respond if an appeal were made to it for aid. I was told by some of the officers of the College that they might ask for small contributions as they would rather have a widespread response than large sums from a few persons.

Thus ended a most dignified and delightful celebration in every way worthy of the great man whose work it honored.

From a librarian's point of view a few of the publications elicited by the Tercentenary are worthy of mention.

(1) Lier and Company of Florence republished in facsimile the 1628 edition, which is in Latin, of the "De Motu Cordis," making it Number v in their wonderful series of reprints known as "Monumenta Medica." A copy of this was presented to each of the delegates as the gift of the Royal College of Physicians of London.

(2) Harvey did not condescend to reply to any of the attacks upon his theory which were provoked by the publication of the "De Motu Cordis," until twenty-one years had elapsed. Then, in 1649, he published at Cambridge and Rotterdam a second small book, also in Latin, "De Circulatione Sanguinis," written in the form of two essays addressed to Jean Riolan, the younger, professor of anatomy in the University of Paris, and a bitter opponent of Harvey's views. In 1653 the "De Motu Cordis" together with the "De Circulatione Sanguinis" were translated and published in English for the first time. Richard Lowndes was the publisher but the name of the translator is not known. It was republished in 1673. This English version has been republished this year by the Nonesuch Press, under the skilful editorship of Dr. Geoffrey Keynes. We might recall that no further English edition of Harvey's writings

on the circulation was published until Dr. Mitchell Ryan made one which was published in the *London Medical and Surgical Journal* in 1832–3. In 1847 Dr. Robert Willis published a new translation of Harvey's works under the auspices of the Sydenham Society. Keynes in an editorial note seems to prefer the contemporary version to the Victorian.

(3) Another edition of Harvey's book has appeared, "Exercitatio Anatomica de Motu Cordis et Sanguinis in Animalibus,"[1] by William Harvey, M.D., with an English translation and annotations by Chauncey D. Leake, Professor of Pharmacology, University of California.

This is a most valuable addition to the Tercentenary literature. It is a very beautiful book, handsomely bound, on good paper, and well printed. The translation is entirely new and clears up many obscure points which occur in the anonymous translation of 1653, and in that of Robert Willis in the Sydenham Society edition of 1847. Dr. Leake is a wellknown authority on the history of medicine and he has appended a number of scholarly and helpful notes to the text. He has also added a chronology of Harvey's life. We have reason to be proud of this tribute from the United States to the great man. Of all the works published in connection with the Tercentenary this is the one which covers most satisfactorily the whole subject and it is a work which every student of medical history will wish to possess.

(4) Dr. Geoffrey Keynes also brought out a "Bibliography of the Writings of William Harvey, M.D." published by the Cambridge University Press, which ranks with his invaluable "Bibliography of the Writings of Sir Thomas Browne." It includes only Harvey's own writings, omitting the inclusion of any of the books written about him or his labors.

In conclusion we can but express the opinion that such international celebrations are not only enjoyable to the participants but are of great value as stimulating interest in important cultural and historical aspects of medicine, and thereby elevating professional standards and in promoting international amity and goodwill.

## THE EDITOR AND THE PUBLISHER TO THEIR READERS

In 1903 Albert Tracy Huntington and John Smart Brownne began the publication of the *Medical Library and Historical Journal*, a quarterly journal of medical history and literature. In 1907 after the publication of five annual volumes, the title of the periodical was changed to *The Aesculapian* and as such continued under the sole editorship of Huntington until it came to an untimely end at the completion of its second volume.

These volumes contained most excellent material by wellknown workers in medical history and literature. They were well got up with excellent illustrations, and yet the project had to be abandoned for the simple reason that it did not receive the necessary financial support.

The *Medical Pickwick* was published for a few years under the editorship of Samuel Brickner. As its name would imply its pages contained more facetiae than solid contributions.

For some years no other publisher was able or willing to undertake a similar enterprise although the interest in medical history and the cultural aspects of medicine was steadily increasing, and there was much regret expressed that no vehicle for the publication of such matter existed in this country.

In the midst of the turmoil and trouble of the World War a publisher was bold enough to take up the project and on a daring scale.

In 1917, just after our country had plunged into the maelstrom, the first number of the first volume of the ANNALS OF MEDICAL HISTORY appeared. Its large pages, beautiful illustrations and typographical elegance, at once attracted attention and the excellence of the articles which it contained fully justified the handsome dress in which it appeared. No advertisements swelled its bulk or marred its beauty, and there were no vulgar facetiae to derogate from its dignity. It was hailed with acclaim as filling the want which had been so frequently expressed. Many expressed the dread that filled the heart of the Sunday School teacher's wife when she exclaimed of her husband that "he was too good to be true" and prophesied that the Publisher had set too high a goal for his aim and that such splendor could not be maintained.

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[1] Charles C. Thomas, Springfield Ill., 1928.

Ten years have elapsed. The ANNALS has continued on its original lines, furnishing first class reading matter, beautifully printed on the best paper, with a wealth of fine illustrations. Among our contributors have been numbered the best known writers in the fields of medical history and literature.

In spite of all this the ANNALS has never acquired a large list of subscribers. The reasons are unfortunately obvious. It has rendered itself a necessary work of reference to every medical library, consequently its files are available in almost all medical centers. We realize that there are many medical journals to one or many of which every medical man feels that he has to subscribe because they deal with the problems which arise in his daily work. To too many members of the medical profession a subscription to the ANNALS seems to be an indulgence in a luxury, and yet these same gentlemen subscribe to many ephemeral magazines which not only do not contain matter of value to themselves but if regarded simply as reading matter for the waiting-room table would not be as much appreciated by their patients as the ANNALS OF MEDICAL HISTORY. If they would try the experiment of placing one or several numbers of the ANNALS on the table in the waiting room they would be quite astonished at the frequency with which their patients would refer to it and talk to them of its contents, for its pages afford attractive reading for the cultured layman as well as for the doctor.

Those who were concerned in the conception and birth of the ANNALS had reason to hope that the project would receive the enthusiastic support of the profession, that at least many would realize the opportunity that was offered to aid in the maintenance of a journal of which the whole profession has reason to be proud. Unfortunately though many read the ANNALS and speak of it in glowing terms they do not feel bound to contribute to its support by subscribing to it. If physicians wishing to give a graduation present to a young friend or desirous of recognizing the services of a colleague would give a thought to the ANNALS they might not only increase its revenue but give pleasure and confer a benefit on the recipient by giving him a year's subscription to it.

With Volume x the First Series of the ANNALS closes. Number I of Volume XI will be Volume I of the New or Second Series of the ANNALS.

There has been but one serious criticism of the ANNALS, its size. So many readers have complained that it was unwieldy or that it would not fit their shelves that the Publisher has decided that beginning with the New Series the format of the ANNALS will be changed. There will be no reduction in the reading matter. Each annual volume will contain if anything more than those of the previous decade. Its artistic elegance will be preserved and the illustrations will be as numerous and as handsome as ever.

Let us hope that with the New Series our subscription list will increase, now that the first ten years have demonstrated the usefulness and value of the ANNALS to all.

THE EDITOR.

With this issue the ANNALS OF MEDICAL HISTORY completes its tenth volume on schedule. Of the original board of editors Dr. Mortimer Frank, Dr. Abraham Jacobi and Sir William Osler have passed away; the rest are still with us and the board now includes nineteen names as against twelve at the start.

For the ardent cooperation of the editorial board and particularly for the courtesy, enthusiasm and indefatigable labors of the editor, Dr. Francis R. Packard, the publisher expresses his keen appreciation. The recipient of the highest encomiums from all parts of the world, the ANNALS at the close of its decennial, feels that it has made a definite and permanent place for itself not only in the literature of medical history but in the hearts of those interested in the subject.

Published without thought of profit but in the hope that some day it will pay its own way, the ANNALS has been issued in a form that was considered a proper dress for the splendid and unusual material contained therein. For its typography as well as for its literary content it has received its due mede of praise and the only suggestions that have been voiced have related to the large format which, we were told, made an uncomfortable size to handle and presented difficulty in filing as it was larger than the average bookshelf.

The end of the tenth volume seemed to offer an opportunity for giving heed to these suggestions and after much deliberation it has been decided that Volume XI shall constitute "New Series Volume I," and shall be 7½ inches wide by 11 inches high. With the able assistance of Mr. F. W. Goudy, who was responsible for the typography of the first ten volumes, it is believed that a format and type style have been arrived at for the new series which, without the loss of any of its esthetic value, will be found easier to handle and more practical to keep.

Another innovation will be the publication of six numbers a year instead of four. The six numbers, though smaller in format, will contain more material than the quarterly and will permit of more prompt publication of the splendid contributions which are now coming in so abundantly. The six numbers will be published at $10.00 per year but present subscribers, in consideration of their support in the past, will be billed for the time being at the same price as heretofore.

With an extensive "reader" list the ANNALS still lacks a subscription list of sufficient size to make it self-supporting. It is without endowment and carries no advertisements. The only financial support received, therefore, is from subscriptions. The intrinsic value of the magazine has been universally admitted and if only the new format, the increase in material and the increased frequency in publication will stimulate more men to subscribe, the future of the ANNALS may be looked to for not only a continuation of but an improvement upon its glorious past. With the endowment of chairs in medical history, notably at Johns Hopkins, with the endowment of libraries for the acquisition and collections of medical history such as the Streeter Collection at the New York Academy of Medicine, it would seem that the subject of medical history is today entitled to and should be able to support in America the "outstanding journal of the subject"—as the ANNALS has been termed.

For past cooperation and for the increased support prophesied for the future, the publisher extends to the medical profession of America his deep-felt appreciation. For Dr. Packard's willingness to assume the further task of an additional two numbers a year, appreciation cannot possibly be expressed in words.

THE PUBLISHER.

# BOOK REVIEW

The Brain from Ape to Man, a Contribution to the Study of the Evolution and Development of the Human Brain. By Frederick Tilney, PH.D., M.D. With Chapters on the Reconstruction of the Gray Matter in the Primate Brain Stem, by Henry Alsop Riley, A.M., M.D. Foreword by Henry Fairfield Osborn, SC.D., LL.D. Two volumes, New York, Paul B. Hoeber, Inc., 1928.

This is not a suitable medium in which to review the scientific study of the anatomy and physiology of the brain which forms the bulk of the two large volumes of Dr. Tilney's great work. Suffice it to say that the microscopic and gross structures of the brain are studied in the most minute detail and illustrated in the large number of accurate and artistic plates and figures. The work, however, contains certain features which render it of the greatest importance to the medical historian, the student of paleontology and all those who are interested in the history of the origin and development of the human race. The recent interest in paleopathology will cause many to read with eagerness the pages in which Tilney summarizes man's rise from the most remote ages to his present status. The attempts by certain ignorant fanatics to control scientific thought and discussion on the subject of evolution render all the more necessary an intelligent knowledge of it, and of the enormous amount of research work which in the last few decades has so wonderfully elucidated points which were heretofore obscure. The present review is only concerned with that part of Dr. Tilney's book which deals with the problem of man's origin and development and no attempt will be made to consider the portion devoted to anatomy and physiology.

There has been much divergence of opinion as to which of the three chief representatives of the family of the Simiidae approaches most nearly in its characteristics to man. Sir Richard Owen assigned to the orang-outang this distinction, while others prefer the chimpanzee. Tilney states that the gorilla, because of the differentiation in its central nervous system, is more like man than any of the other Simians. The actual interrelationship between man and the great apes seems more likely to be based upon derivation from some common or generalized stock which held in it the potentiality to specialize along the anthropoid line in one direction, and through certain subhuman stages to man in another. Thus man, modern or paleolithic, cannot trace a direct line of descent to one or the other of the living anthropoid apes. Of the genera of the Simiidae, the orang-outang is placed by Tilney lowest in the scale, the chimpanzee next above, and the gorilla next to man, basing his opinion chiefly on the morphological consideration of the brain structure. Tilney gives interesting summaries of the studies made by various observers on the habits and mentality of the orang-outang, chimpanzee and gorilla. Professor Robert M. Yerkes studied the psychology and habits of the orang-outang; Professor Köhler those of the chimpanzee and Miss Cunningham observed the gorilla John Daniel I, and is now studying John Daniel II.

Probably twenty-five million years ago two great branches of the suborder Hominidae parted company in the progress of their development. The first branch gave rise to the anthropoid apes in the family Simiidae, including the orang-outang, chimpanzee and gorilla (and two extinct forms Dryopithecus and Paleopithecus).

The second branch gave rise to the human family, in all its varieties of races. There are at least four prehistoric, now extinct, races of man. Not one of these races can be considered the direct ancestor of living man any more than the existing genera of great apes.

The first of these extinct prehistoric races was (1) Pithecanthropus erectus, remains of which, found in Java by Eugen Dubois, have so many simian and human qualities that he represents a transitional stage in human evolution. Pithecanthropus erectus had a head and face not unlike an ape, but a brain considerably larger than any known simian. He walked erect and employed his hands in the use of weapons and certain crude implements. His superiority over his contemporary animals was maintained with difficulty by means of his dawning ingenuity and because of his slightly superior intelligence. His brain, though larger than that of any of the other apes, was much below the volume of the average human brain. He had acquired some forms of speech and he lived in primitive communities.

(2) Early in the Pre-Paleolithic Period but much later than Pithecanthropus erectus, the remains of another extinct race of man have been found, Paleoanthropus heidelbergensis. His antiquity is variously estimated at 350,000 to 450,000 years. The Heidelberg man made use of crude implements of wood and stone. This race probably became extinct within the course of 100,000 years. Because of the simian affinities in his jaw and teeth the Heidelberg man is excluded from the direct ancestral line of man.

Although the race of Heidelberg men became extinct, before doing so they gave rise to another race called Homo neanderthalensis, or Homo primigenus, which gave a decided impetus to the process of human evolution. The Neanderthal man has left many implements which indicate that he had made marked advances over his predecessors. Again, however, the skull of the Neanderthal man was too apelike to permit us to regard him as an ancestor of modern man although his brain and the general structure of his body show an approach towards that of Homo sapiens. In part contemporary with both Pithecanthropus erectus and Homo heidelbergensis a third race of man, Eoanthropus Dawsoni, the Piltdown man, appeared in the Lower Paleolithic Period, who approaches the modern man more nearly than any of the others. Though some authorities regard the Piltdown man as the direct ancestor of Homo sapiens, others regard him as belonging to another altogether independent race.

Thus prehistoric evidence of a common progenitive stock for the present human race is altogether lacking. Of all living races of mankind Sir Arthur Keith believes the aborigines of Australia alone have the intermediate and generalized characteristics requisite for such an ancestral form, capable of producing descendants so diverse as the typical African and the northwestern European.

If the Australian or some other primitive race was the common ancestor of all the varied modern human race, it certainly required a long period of evolution to produce such divergent descendants. Sir Arthur Keith believes it required as long a period as the entire Pleistocene, placing Pithecanthropus even further back than is usually thought.

Tilney passes from this phase of man's history to the consideration of the beginnings of the human race as far as they can be traced in cultural remains and it is this part of his monumental work which is of the greatest interest to those who are interested in the history of the development of knowledge and culture. Beginning as a Nomadic hunter, but little in development above the wild animals among whom he lived, man developed crude mechanical appliances which enabled him to gain a greater supremacy in the chase. He also learned to provide for his needs by cultivation of the soil, adapting utensils for this purpose. His progress through the ages is marked by the improvement which is shown in the implements which are found as landmarks of the state in which he lived when using them.

Pithecanthropus erectus lived during the First Glacial Period, a million years ago, and we know nothing positive concerning his cultural development as we have no certain remains to show it; though some think that the "eoliths" found at Piltdown, Sussex, are stone implements which were used by him.

In the next age, the Paleolithic Period, we find definite remains of tools or weapons which our ancient representatives constructed. Of the earliest part of the Lower Paleolithic Period, the Pre-Chellean, (beginning some 700,000 years ago) we have remains of stone implements, knives, borers or drills and hammers. Except for these stone utensils there is nothing to indicate that he had risen much above the level of the beasts that he hunted. Such was the status of the Heidelberg man, and the Piltdown man. They were followed in the next, the Chellean Period by the Neanderthal man, whose implements show considerable improvement in their construction. He made a cutting tool of flint, with the sharp edge of which he cut wood, and he made arrowheads and spearheads of flint. About 150,000 years ago the Neanderthal man advanced a great step when during the Mousterian Period he became a cave dweller, and as such developed the conception of property holding. For some unexplained reason the Neanderthal race disappeared some time towards the end of the Lower Paleolithic Period. It was replaced by the Cro-Magnon, a much more highly developed race, one which we are not ashamed to claim as a member of the species Homo sapiens. The Cro-Magnon flourished during the end of the Fourth Glacial Period or the beginning of post-glacial time, and as this covers some 25,000 or 30,000 years we believe that Homo sapiens has inhabited Europe for about 30,000 years. Osborn shows in "Men of the Old Stone Age" how the superior race of Cro-Magnons replaced the Neanderthal race, their superior intelligence furnishing them weapons, such as bows and arrows, and yielding them means of offense and defense not possessed by the distinctly lower people, who were also weakened by disease and by the severe climatic conditions of the Fourth Glacial Period.

The Cro-Magnons probably originated in Asia. Their large skulls with an almost modern forehead and forebrain show that they possessed "a brain capable of more complex ideas, greater comprehension, more reasoning powers, a wider, more facile imagination." They had highly developed artistic sense as shown by the pictures which remain on the walls of caves in which they dwelt. Their implements show great advance in their finish, variety and applicability, and they devised instruments with which they could engrave and sculpture rock. But, just as the Neanderthal man reached a point of development much beyond others and then declined and disappeared, so the Cro-Magnon after reaching far beyond any of his predecessors began to decline and, as Tilney says, "at length in the *Azilian Period* the last survivors of the greatest race in the Old Stone Age, senescent in their industries, decadent in their art, saw the setting of the Cro-Magnon sun and the passing of their kind into darkness."

The question why the Cro-Magnon developed their characteristic Aurignacian art, of which there are so many remains in their caves in the south of France, is of great interest. The most usual supposition is that the drawings and carvings were used as instruments of magic to aid in the procurement of food, or in protection against wild beasts, just as the Australian or African native at the present day makes images or draws pictures of the fish or animal he wishes to capture and by means of incantations spoken over or wounds made on the fetish believes he can aid in the chase of its prototype. The Cro-Magnon race disappears with the Old Stone Age, some 10,000 years ago and Neolithic man comes on the scene. He polishes his stone implements and shows a rudimentary knowledge of agriculture by his use of a variety of plants and seeds and by his manufacture of tools to aid him in his tillage. Neolithic man also domesticated animals, utilizing the horse and the cow, and raising sheep, pigs and goats for food. After flourishing for some 5000 years Neolithic man was replaced by the man of the Bronze Age, our own immediate ancestor.

One of the most interesting chapters of Tilney's book is devoted to a study of "The Brain of Prehistoric Man," in which, avoiding rash speculation, he sums up the positive information which has been derived from careful study of the various prehistoric skulls which have been discovered in recent years. In the next chapter Tilney shows how the development of the frontal lobe indicates the progress of man's intelligence, and he concludes with the hopeful statement "that the brain of modern man represents some intermediate stage in the ultimate development of the master organs of life. And the greatest possibility for future progress lies in the further development of the frontal lobe."

Dr. Tilney concludes this wonderfully interesting, original and inspiring work with the query whether the human brain is not capable of yet further development, of even greater potentialities? We gather that he is optimistic and feels it is. At any rate his book reveals on what ground one can justify such optimism.

FRANCIS R. PACKARD.

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